

ARCHITECTURAL

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GRANITE

VAHAN HAGOPIAN

NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION, INC., BOSTON, MASS.

FOREWORD

The widespread introduction of machine processes during the past decade has practically revolutionized the granite industry. This has resulted in speeding up production, substantial reductions in cost and new possibilities for economic use.

The transition from slow, expensive hand work to speedy, efficient machine production is still under way, and promises even greater development for the future. Knowledge of what has and can be done in the production and finishing of granite for architectural purposes is more essential now than ever before if full advantage is to be taken of its aesthetic and economic possibilities.

This catalogue, "Architectural Granite," has been prepared as one of the services of the Association to provide architects, designers, specification writers and prospective users of granite with up-to-date information. Certain facts are also presented relative to the Association, its members and their

granites which we believe will be informative and useful. Much of the information is general in application to practically all granites, but the descriptions and color reproductions of specific granites are confined to those quarried and manufactured by member companies.

Architects and prospective users of granite are invited to make free use of the many services of the Association. These services represent the combined information and experience of the industry and are made possible by the co-operation and support of a representative group of granite producers who believe that such services are beneficial alike to architects, users and producers of granite.

In addition to being incorporated complete in the 1931 Edition of SWEET'S ARCHITECTURAL CATALOGUE, "Architectural Granite" is published by the Association in booklet form, copies of which will be sent upon request.

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INFORMATION REGARDING THE ASSOCIATION OF INTEREST TO THE ARCHITECT AND SPECIFICATION WRITER

The Association and Its Purpose

The chief aim of this Association is to further the use and sale of granite for building purposes by extending the knowledge of its many qualities and merits, and by establishing means of closer co-operation between producers of granite and architects and general building public.

Real Service to Architects

The Association, through its Research and Information Bureau and its field men, offers a convenient and unbiased service to architects and others interested in the use of granite for permanent construction.

This service is freely offered wherever it may assist in the logical and proper use of granite or help to solve the economic and aesthetic problems which may arise when the use of granite is under consideration.

Research and Information Bureau

This department has been developed to collect and disseminate useful and reliable information concerning granite. This information is being gathered constantly from within and without the industry and the Association has become the clearing house for the best information available.

Study and research is being carried on concerning the different granites available for architectural uses, the chemical and physical properties of granite, problems in economic detailing and production, experience and good practice in actual use.

Architects, and others interested in the use of granite, are invited to make use of the services of this department freely and all requests for information pertaining to granite will receive willing and careful attention.

Field Service of the Association

Qualified representatives of the Association are in the field calling upon architects for the purpose of making available the facts and information accumulated by the Research and Information Bureau. Timely and unbiased information may be had through the field service. Economic points as to design, detail and specification of granite work may be discussed and quickly settled.

The field men will be glad, when requested, to obtain information which may not be immediately available, and to assist the architect and specification writer in every way possible in connection with the use of granite.

The Association can render most valuable service when a project is in its preliminary or initial stages. The architect need not hesitate to discuss a project with our representative at any time, and if for any reason he wishes to avoid premature publicity he need only so indicate and the matter will be treated as strictly confidential until such time as information concerning the project may be properly reported to our member companies.

Service of Representatives of Member Companies

The member companies of the Association maintain sales offices and representatives in many of the larger cities. These men are experts on granite and well qualified to render definite and valuable services to architects and specification writers in their districts.

Accurate and reliable information may be secured by consulting these representatives when any specific project is under consideration, and they are always willing to furnish samples of their granites or to submit preliminary or final estimates upon specific work.

Permanent Exhibits of Granite and Finishes

The Association maintains permanent exhibits of the various standard building granites, produced by its member companies, at the following convenient addresses: Architects Samples Corp., 101 Park Avenue, New York; Master Stone Cutters Assn., Architects Building, 17th and Sansom Streets, Philadelphia; National Building Granite Quarries Association, 31 State Street, Boston.

Here will be found the various colors and textures from which architects may make selections of granite for any specific project. Here also are displayed complete sets of samples illustrating the regular building granite finishes, which the Association has adopted as standard. The selection and specification of finish for any specific job by reference to these standards, will assure definite and mutual understanding as to just what is wanted.

A model "Study in Granite" is included in the New York exhibit, illustrating the possibilities of combining various colors and textures, using standard granites.

Architects and the general building public are invited to inspect these exhibits when considering the selection of materials or finish.

Securing Estimates and Samples

The Association does not quote prices, but requests for preliminary or final estimates on granite work will be transmitted to interested members and estimates promptly obtained.

Plans and specifications for specific work may be sent in to the Association office and made available to its members for estimating purposes. Architects and contractors are invited to avail themselves of this service, which has proved its value and frequently produces bids which might not otherwise have been secured.

Requests for samples will be transmitted to members producing the kind and quality of granite desired, and information will be furnished as to where specific colors and qualities of granite may be obtained, whether produced by Association members or non-members.

The Association Code of Ethics

The Association stands for fair practice in bidding and advocates that bids, tendered in good faith in accordance with plans and specifications, should be fairly considered and used, both as a matter of principle and in order that the best interests of all parties concerned may be assured.

Uniform Proposal and Contract Forms

Uniform Proposal and Contract Forms for granite work have been prepared and adopted by the Association. The terms and conditions are fairly standardized and the equity of both parties has been carefully studied and protected.

These printed Association forms have been in use for several years and have met successfully the test of application. Two forms of contract are provided, one for the granite work "Set in Place" and one for the work "f.o.b." These Contract Forms are recommended by the Association for general use on granite work, and copies will be sent for inspection upon request.

Responsible Competitive Estimates

The Association, through its reports to members concerning prospective work and bids desired, stimulates competitive bidding, backed up by responsible concerns operating the best organized and equipped plants in the granite industry.

Architects and contractors, who advise the Association concerning bids desired, undoubtedly will secure a larger number of responsible, competitive bids, with a minimum of effort and expense. Requests for bids, with information as to closing dates, are transmitted to the member companies upon receipt, and bids are sent direct to architect or contractor by those bidding.

The Association has no control over or responsibility for prices made or quoted by its members, and has no knowledge as to who are bidding or the amounts bid until after the bids are delivered and opened by the recipient on the date set for closing.

Financial and Production Responsibility of Individual Members of the Association

To meet successfully the demands of modern building construction, the granite producer must fulfill very definite requirements as to financial responsibility, type of organization, and adequacy of quarries and finishing plants.

Association members have been and are the leaders in developing their financial organization and production facilities to meet these exacting requirements. They can furnish unquestionable references as to past performance and responsibility, and are entitled to preferential consideration wherever building granite is under consideration.

In granite, as in other materials, bids are submitted and contracts undertaken by concerns which lack the experience and ability to execute them satisfactorily, and whose quarries and plants are inadequate to meet the requirements. These facts should be carefully considered when awarding the granite contract. Bids tendered by Association members should receive especial consideration on the ground that contracts based upon them will be satisfactorily executed.

Adequate and Dependable Quarries

In selecting granite for building purposes, the ability of the quarry to produce the quantity, sizes and quality of granite desired is the first essential. The quarry must be so equipped that its output may be handled and shipped at a rate to meet the cutting requirements, not only for the work under consideration, but all the work which may be simultaneously under contract.

The Association quarries, without exception, meet the above requirements. They are all quarries of established reputation and have been developed to meet the requirements of quantity production.

Modern Cutting and Finishing Plants

Granite is delivered to the finishing plant from the quarry in rough blocks—some already split to approximate dimension sizes, and others to be drilled and split to dimension, or sawed into slabs.

Modern building granite plants must be well equipped with up-to-date machinery and appliances for handling and manufacturing granite in considerable quantity, efficiently and with first class workmanship.

Included in the essential equipment of a modern granite finishing plant are saws, carborundum machines, polishing machines, pneumatic surfacing machines, turning lathes, sand blast, pneumatic hand and carving tools, and pneumatic drills. The handling equipment must be adequate and speedy, and arranged to serve the producing machinery and hand workers, and to handle the storing and loading, efficiently and safely.

The handling, machinery, sawing and polishing of granite requires power in large quantities. Adequate

and dependable power is therefore a most important essential, and adequate blacksmith shops, carpenter shops and repair shops are also necessary accessories to a properly equipped plant.

Handwork is required in finishing the average type of architectural granite work, and a good journeyman granite cutter is one of the most skillful craftsmen in industry today. Modern tools and machinery have relieved this craftsman of a great deal of laborious and time consuming work, but his skill of hand and eye is as indispensable today as when the Egyptians cut their granite temples.

Association plants include the largest and best equipped plants of their kind in the country. They have been established for considerable periods and a "home guard" of skilled workmen has been built up to supply their steady demand for first class men. These are important factors in the superior ability of Association plants to fulfill both the quality and quantity demands for architectural granite work and entitle them to preferential consideration.

Each Member Has An Experienced Organization

Without a properly managed and experienced organization, even an adequate quarry and well equipped finishing plant will not ensure satisfactory execution of contracts.

Association members have built up organizations having the necessary experience and ability to put through whatever they may undertake. Their estimators have the benefit of actual cost figures covering a wide variety of executed work, thereby removing much of the guesswork and chance taking, because of which many a job is skimmed and botched. Their draftsmen are the best trained men to be had and their knowledge of practical stereotomy, skill in layout and accuracy in figures may be counted upon to discover, in advance, errors in vital dimensions or impractical points in construction or jointing, thereby avoiding delay and expense to all concerned.

Experienced and practical salesmen constitute a service as well as a sales force, and the co-operation they are able to offer is frequently of no small importance in the securing of reliable preliminary estimates and in consultation as to practical economies possible.

Importance of Proper Planning and Supervision in the Mill

The planning and routing of work through the mill and its consistent and thorough inspection while in process and at completion, due to well trained and experienced plant management, is all reflected in expedited erection at the building and a minimum of interference with the progress of the work of other trades.

Inadequate or inexperienced plant management and supervision usually goes hand in hand with inordinately low bids, and poor workmanship, delayed and muddled deliveries, expensive tie-ups and delays to other trades on the building itself, usually follow as a natural consequence, and more than eat up any supposed savings.

The Association's Relation to Member Companies

The Association is maintained by its member companies as a vital and necessary extension of their individual organizations, to carry on collectively those important services which make for efficiency and economy and are alike beneficial to the users and producers of granite generally.

CLASSIFICATION OF BUILDING GRANITES QUARRIED BY ASSOCIATION MEMBERS

White, Gray, Buff, Lavender, Pink, Red, Green

Name of Granite	Plate No.	Color	Grain	Technical Classification	Location of Quarry	Quarried by
Bethel White	1	White, faintly mottled with gray.....	Coarse inclined to medium ..	Quartz-monzonite.	Bethel, Vt.	Woodbury Granite Co., Inc., Burlington, Vt.
Mount Airy	2	Very light gray.....	Medium	Biotite	Mount Airy, N. C.	North Carolina Granite Corp., Mount Airy, N. C.
North Jay	3	Very light gray.....	Fine	Biotite-muscovite..	North Jay, Me....	Maine & New Hampshire Granite Corp., North Jay, Me.
Milford, N. H....	4	Light gray	Fine inclined to medium	Quartz-monzonite.	Milford, N. H....	Kittredge Quarries, Milford, N. H.
Carolina Gray	5	Light gray, flecked with pink	Medium	Biotite	Granite Quarry, N. C.	The Harris Granite Quarries Co., Salisbury, N. C.
Swenson Gray	6	Light to medium gray	Fine to medium	Muscovite-biotite..	Concord, N. H....	John Swenson Granite Co., Concord, N. H.
Mount Waldo.....	7	Light to medium gray	Medium	Biotite	Frankfort, Me. ..	Grenci & Ellis, Inc., Peekskill, N. Y.
Woodbury Gray ..	8	Medium gray	Medium	Biotite	Woodbury, Vt. ...	Woodbury Granite Co., Inc., Burlington, Vt. .
Barre Building....	9	Light to medium bluish gray	Fine to medium	Biotite	Barre, Vt.	Cut by Cook, Watkins & Patch, Inc., Barre, Vt.
Connecticut White	10	Medium buff gray, hammers light.....	Fine	Quartz-monzonite.	Waterford, Conn..	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York City
Light Mohegan ...	11	Light grayish buff...	Medium	Muscovite-biotite..	Peekskill, N. Y....	Grenci & Ellis, Inc., Peekskill, N. Y.
Dark Mohegan....	12	Deep yellowish buff..	Medium	Muscovite-biotite..	Peekskill, N. Y....	Grenci & Ellis, Inc., Peekskill, N. Y.
Swenson Buff Antique	13	Light to medium grayish buff	Fine to medium	Muscovite-biotite..	Concord, N. H....	John Swenson Granite Co., Concord, N. H.
Goss Pink Deer Isle	14 15	Pinkish, lavender tinted, medium gray	Coarse	Biotite	Crotch Island, Stonington, Me..	John L. Goss Corp., Stonington, Me.
Old Pink Milford.	16	Light to medium pink with black spottings	Medium to coarse	Biotite	Milford, Mass. ...	L. Luchini & Son, Milford, Mass.
Swenson Pink	17	Light pink with occasional black waves and pink stripes...	Medium to coarse	Biotite	North Berwick, Me.	John Swenson Granite Co., Concord, N. H.
Conway Pink	18	Light pink mottled with large dark gray and small black spots	Coarse	Biotite	Redstone, N. H....	Maine & New Hampshire Granite Corp., North Jay, Me.
Somes Sound	19	Light pinkish buff mottled with gray.	Medium inclined to coarse	Biotite	Mt. Desert, Me....	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York City
Carolina Pink	20	Light mottled pink..	Medium inclined to coarse	Biotite	Near Granite Quarry, N. C....	Cut by The Harris Granite Quarries Co., Salisbury, N. C.
Balfour Pink	21	Light, uniform, slightly purplish pink	Medium	Biotite	Granite Quarry, N. C.	The Harris Granite Quarries Co., Salisbury, N. C.
Jonesboro Red ...	22	Medium reddish pink uniformly mottled with smoky quartz and flesh colored feldspar	Coarse inclined to medium ..	Biotite	Jonesboro, Me. ...	Booth Bros. & Hurricane Isle Granite Co., 208 Broadway, New York City
Conway Green....	23	Dark olive green with black spottings	Coarse	Biotite-hornblende.	Redstone, N. H....	Maine & New Hampshire Granite Corp., North Jay, Me.

BETHEL WHITE*Quarried and cut by:***Woodbury Granite Co., Inc.
Burlington, Vt.***Quarry at Bethel, Vt.*

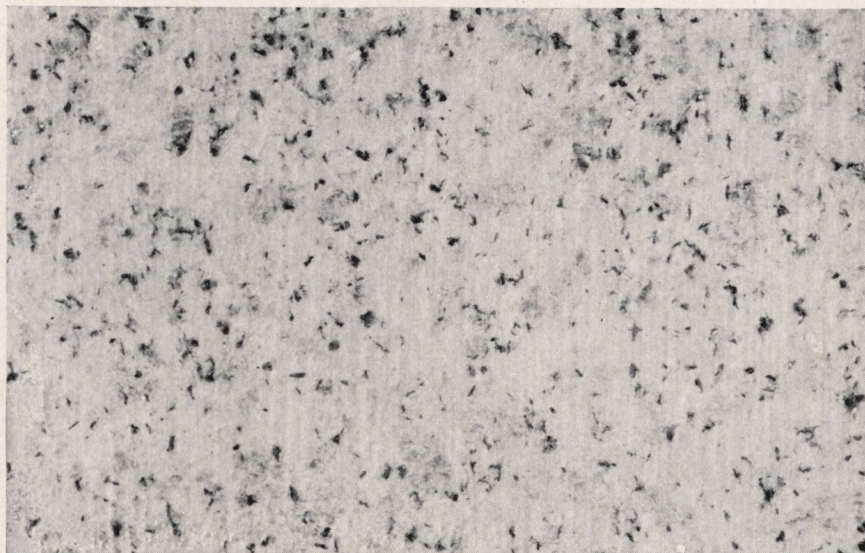
A strictly white, quartz-monsonite granite faintly mottled with gray, and with coarse inclining to medium grain. Its hammered face is considerably whiter than its rough or polished face and hammering also diminishes the prominence of the gray micaceous spots. Takes a high polish which emphasizes the gray mottling and mica spottings. Is beautifully white in hammered finish and is excellently adapted for fine carving.

Note: Actual granite much whiter than reproduction.

**Plate No. 1. Bethel White Granite—Hammered****MOUNT AIRY***Quarried by:***North Carolina Granite Corp'n
Mount Airy, N. C.***Cut by:***J. D. Sargent Granite Co.
Mount Airy, N. C.****North State Granite Co.
Mount Airy, N. C.****Mount Airy Granite Cutting Co.
Mount Airy, N. C.**

A very light gray, almost white biotite granite of medium grain. The nearly white background of feldspar is evenly mottled with slightly bluish-gray quartz and uniformly stippled with small biotite crystals, emphasizing the whiteness and giving strong character to the granite. Especially adapted for building work and mausoleums.

Note: Actual granite whiter than reproduction.

**Plate No. 2. Mount Airy Granite—Hammered****NORTH JAY***Quarried and cut by:***Maine & New Hampshire Granite
Corp'n****North Jay, Me.**

A very light gray biotite-muscovite granite with fine even grain. Its general whiteness is due to the whiteness of its feldspars and clearness of its quartz. Fine, evenly distributed particles of biotite give life to the granite and emphasize its lightness of color. Its free working qualities, light color and fine grain adapt North Jay Granite equally well to fine details and carving or plain work of more rugged character.

**Plate No. 3. North Jay Granite—Hammered**

A SERVICE FULFILLING THE RECOMMENDATIONS OF THE AMERICAN INSTITUTE OF ARCHITECTS

Institute Advocates Knowledge of Materials

For a number of years the various chapters of the American Institute of Architects have advocated closer relations between the architect, designer and craftsman, and a more intimate knowledge of materials and methods of working them, so that better architecture may be produced.

Since earliest times granite has been used in the finest of buildings because it combines beauty and durability to an unusual degree. More recently, since cost became such an important factor, the use of granite has often been restricted because of excessive cost over softer, more easily working stones. A better understanding of its exceptional architectural qualifications, and how to adapt design and details to take fullest advantage of its aesthetic qualities and economical methods of cutting, would ordinarily so reduce the cost that the use of granite would be greatly increased.

The greatest asset of the true designer is complete sympathy for and knowledge of the material in which he

designs. It is therefore important that both the designer and specification writer be as fully informed as possible concerning granite and its economical working possibilities. To that end this Association offers its services.

Information on Granite Made Available

Several years ago the NATIONAL BUILDING GRANITE QUARRIES ASSOCIATION decided that all possible information regarding granite and its economic use should be collected and made available to architects and users. This could be done more efficiently by the Association than by individual producers, as it involved considerable expense and, to be of maximum benefit, should be unbiased, continuous and representative of the best experience and practice. The Research and Information Bureau was therefore set up in the Association and a fund of reliable and useful information, heretofore not generally known outside the industry itself, was made available to architects, designers and specification writers.

GRANITE AND ITS ARCHITECTURAL QUALIFICATIONS

Natural Qualifications

Granite has exceptional strength and durability, is practically non-absorbent, and indefinitely withstands exposure to climate and weather. It is available in a wide range of colors and textures and has inherent beauty and character to be found in few other materials.

Granite may be cut into any form desired and dressed in a great variety of finishes. It takes a high and durable polish which will withstand long exposure to the weather. It may be carved with as much refinement of detail as desired. Granite is pre-eminently suited by nature for exterior architectural uses, and its natural qualifications are unsurpassed and rarely equalled by any other building stone.

Description of Granite

Granite is technically described as a holocrystalline, granular rock of igneous origin. The essential constituents are quartz and a potash feldspar. The principal accessory mineral is usually either mica or hornblende. Other minerals occur in small quantities, but are generally secondary to those mentioned.

The accessory mineral, mica, occurs in two forms—black mica or biotite, and white mica or muscovite. The hornblende in building granite is usually black or a very dark green.

Granites are technically classified by the predominating accessory mineral. The most common varieties of building granites are known as biotite, muscovite, biotite-muscovite, muscovite-biotite, hornblende, biotite-hornblende, and quartz-monzonite granites.

As a general rule the color of granite is determined by that of its feldspars, and the hardness by the quartz and feldspars, varying according to the proportion and hardness of the feldspars.

Colors and Textures—The granites produced by Association members include many shades of gray, lavender, pink, red, green, brown, buff, and white.

Natural texture varies according to the distribution and size of crystals of the constituent minerals. Granite is graded, as to grain, by the size of its feldspar crystals, from very fine to very coarse. The size of crystals or coarseness of grain has practically no bearing on the structural qualities, but gives to granite the variety of texture which adds greatly to its architectural possibilities.

Physical and Chemical Tests

The standard building granites produced by Association members so far exceed all ordinary architectural requirements as to physical and chemical properties, that specific data on physical tests and chemical analyses have little or no bearing upon the relative architectural merits of the different granites.

In confirmation of this, a detailed statement prepared by George F. Loughlin of the United States Geological Survey is on file in the Association office, a copy of which will be mailed on request.

Quality of Material and Workmanship

As noted under "Physical and Chemical Tests," the standard building granites so greatly exceed all possible requirements of architectural use, that standards as to quality of material are unnecessary, other than that they be sound, free from flaws or defects which would impair their strength and from stain or defects which would mar their appearance.

Quality of workmanship has been graded by usage into three classifications, which, while somewhat elastic and difficult to define exactly, are pretty well established and recognized in the trade, as follows:

Monumental Building Grade—For permanent buildings designed to perpetuate public pride or civic spirit, where utility and economy are subordinate to architectural merit, such as State house, courthouse, library or public memorial.

Good Commercial Grade—For high class buildings designed both for utility and to express something of the character, dignity and stability of the occupancy, such as banks or insurance buildings, high class office buildings, churches, schools, etc.

Ordinary Commercial Grade—For buildings where architectural appearance is subordinate to utility and governed by economic considerations. Workmanship will meet requirements of structural safety, but not carried beyond the point of a good appearance to the casual observer.

Color Plates

Plates Nos. 1 to 23 reproduce in color the principal building granites produced by Association members. They are full size as to grain but approximate only as to color. Both polished and hammered samples are included and it should be borne in mind that polishing brings out color and deepens tone while hammering lightens and softens the color of the granite. These plates will assist in making preliminary selections but final selections should always be made from actual samples.

MILFORD NEW HAMPSHIRE

Quarried by:
Kittredge Quarries
Milford, N. H.

A quartz-monzonite granite of light gray shade with a very slight bluish tinge, spangled with black mica. The Kittredge quarry produces a fine, inclining to medium grained granite for building work and a very fine grained granite for monumental uses. The chief characteristics of the finer grained granite are its uniformity and delicacy of tint and its adaptability for fine details and carving. Its free working qualities well adapt it for general building purposes and also for curbing and paving.



Plate No. 4. Milford New Hampshire Granite—Pointed

CAROLINA GRAY

Quarried and cut by:
The Harris Granite Quarries Co.
Salisbury, N. C.

A light gray biotite granite of medium grain. Sparsely scattered flecks of pink give the surface a unique character especially when polished. These small pink spottings are not close enough together to modify the light gray color, but give life and warmth to the stone and emphasize its whiteness. It takes a good polish, dresses well under the hammer and is well suited to building uses.

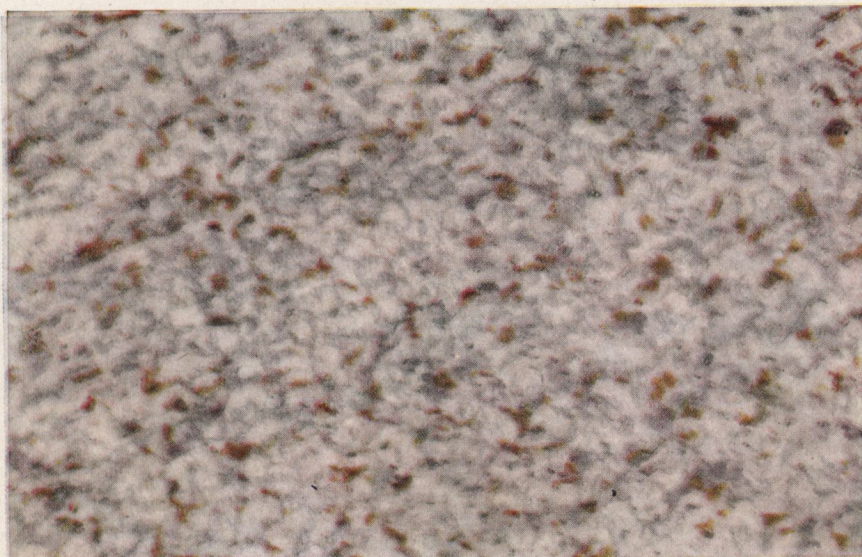


Plate No. 5. Carolina Gray Granite—Polished

SWENSON GRAY

Quarried and cut by:
The John Swenson Granite Co.
Concord, N. H.

A muscovite-biotite granite of light to medium bluish gray color and fine to medium, somewhat porphyritic texture. Polishing deepens the tone and brings out the bluish cast, while hammering lightens the color appreciably, there being considerable contrast between the rough and hammered faces and strong contrast between hammered and polished. The fast working qualities of this Concord granite contribute materially to economical cutting, and it is used extensively for both building and monumental work.



Plate No. 6. Swenson Gray Granite—Polished

DETAILING FOR GRANITE—THE USE OF THE “MEMBER SYSTEM” IN ESTIMATING COSTS

The use of granite is often restricted because of its cost as compared with freer working stones. The cost of granite need not be so frequently prohibitive if certain facts are considered by the specification writer and the designer.

The cutting of mouldings on granite work involves a greater amount of expensive hand labor than on other

classes of work. Mouldings lend themselves to reasonable modification and the cost savings possible are well worth careful consideration when detailing for granite. Some knowledge of the method generally used in estimating cost of cutting granite mouldings will give the designer a good idea as to the relative cost importance of moulded details.

The “Member System” for Estimating Granite Mouldings

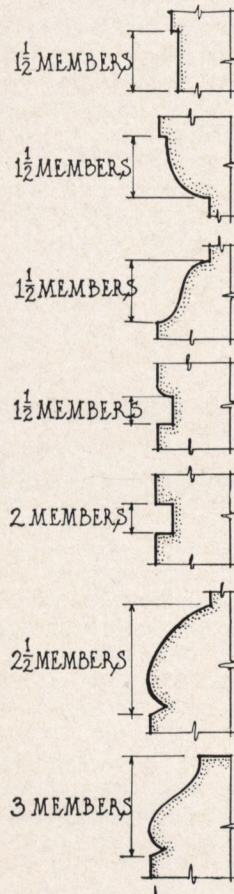
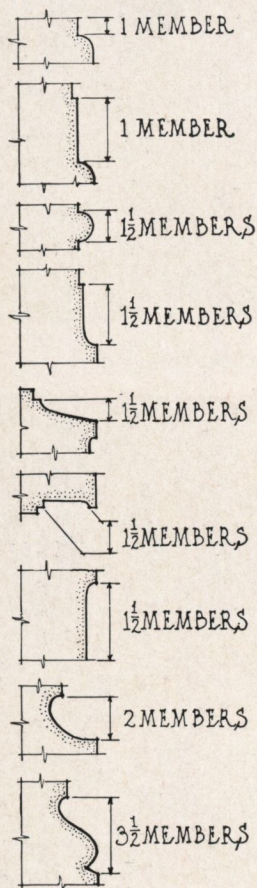
The so-called “Member System” is generally used in estimating cost of cutting granite mouldings.

The profile of a moulded section is first divided into units called “members,” a “member” being a more or less arbitrary unit in which the edges, contour, changes in direction and width between edges are taken into consideration.

In counting the number of “members” in any given profile, no hard and fast rules can be laid down, but 4 in. of any contour is the maximum to be counted as a single member. Several basic member counts are illustrated here, and from these practically any ordinary moulded profile may be built up and counted.

To estimate the approximate cost per lineal foot of a moulded profile, multiply number of “members” by the unit of “member” cost per lineal foot and add the cost of plain face displaced by the membered surface at its unit cost per square foot.

The unit cost per lineal foot of “member” varies with grade of granite and finish, as do the unit costs per square foot of plain surface. For approximations, one lineal foot of “member” may be considered equal to a square foot of plain surface for any given granite or finish.

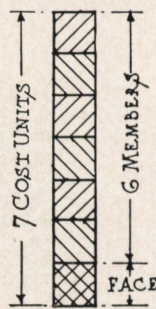
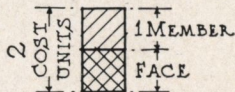
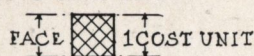


Relative Cost of Plain and Moulded Faces

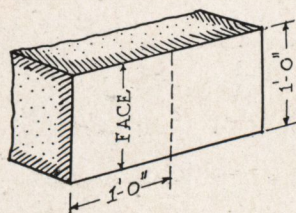
The cost per lineal foot of a moulded surface, as explained above, is approximately:

Area of face @ face unit + number of members @ member unit

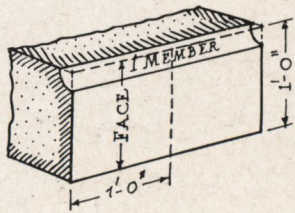
The example below visualizes the application of this rule in making relative cost comparisons. Three granite sections are shown of equal face area. “A” has no members; “B” has one member; “C” has six members. The relative cost per lineal foot is illustrated by the squares above each section.



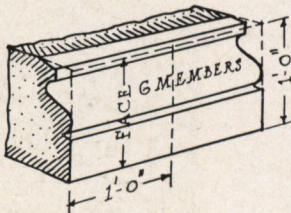
COST PER LINEAL FOOT



(A)



(B)



(C)

PLAIN AND MOULDED SECTIONS OF EQUAL FACE AREA

Assume cutting cost unit for plain face and for members is \$1.50. Applying this unit to these examples, the surface cost per lineal foot of “A” = \$1.50; “B” = \$3.00; “C” = \$10.50. From this example the relative cost effect of superfluous “members” is quite apparent.

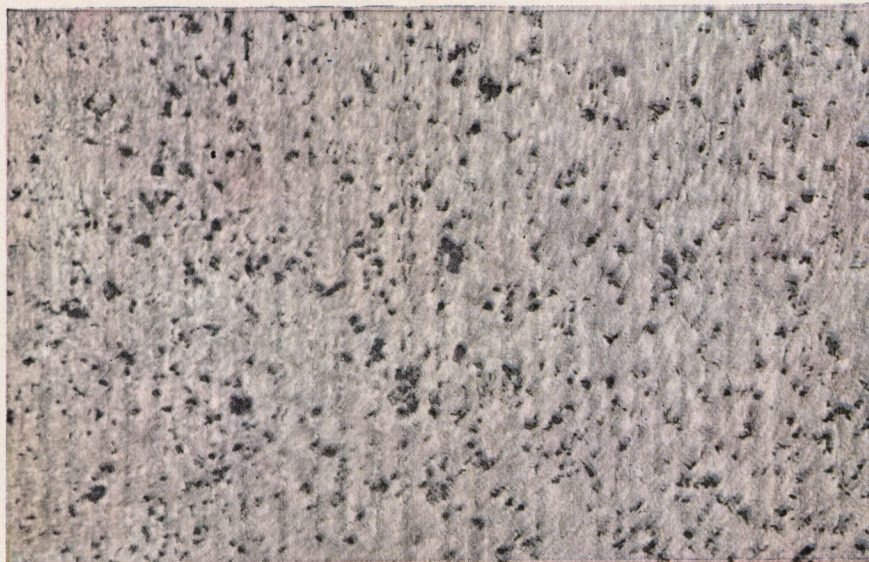
The designer, when detailing for granite, can quickly apply this principle to any moulded section under consideration.

PLATE A

MOUNT WALDO*Quarried and cut by:***Grenci & Ellis, Inc.
Peekskill, N. Y.**

Quarry at Frankfort, Me.

A biotite granite of light to medium gray shade and with medium inclining to fine, even grained texture. The whiteness of the feldspars is lightly shaded by the gray smoky quartz. Small but well defined biotite crystals distributed quite uniformly but coarsely over the surface give life and character to the granite and emphasize the whiteness of the feldspars. It works freely under the hammer and is well adapted to general building uses.

**Plate No. 7. Mount Waldo Granite—Hammered****WOODBURY GRAY***Quarried and cut by:***Woodbury Granite Co., Inc.
Burlington, Vt.**

Quarry at Woodbury, Vt.

A medium gray biotite granite with somewhat bluish cast and medium texture. Its mineral contrasts are quite marked, especially on the polished face. It is adapted for both building and monumental uses, the monumental grade having a fine inclining to medium texture and somewhat less marked mineral contrasts. Woodbury Gray works well under the hammer and is well adapted for both plain and carved work.

**Plate No. 8. Woodbury Gray Granite—Hammered****BARRE BUILDING***Cut by:***Cook, Watkins & Patch, Inc.
Barre, Vt.**

Quarried at Barre, Vt.

A biotite granite of light medium, slightly bluish gray color and fine to medium grain. It is somewhat coarser and less even grained than the "Light Barre" granite produced by the same quarry for monumental purposes, but is otherwise identical and of equal physical quality with the monumental grade. Its good weathering and easy working qualities well adapt this granite for all building purposes.

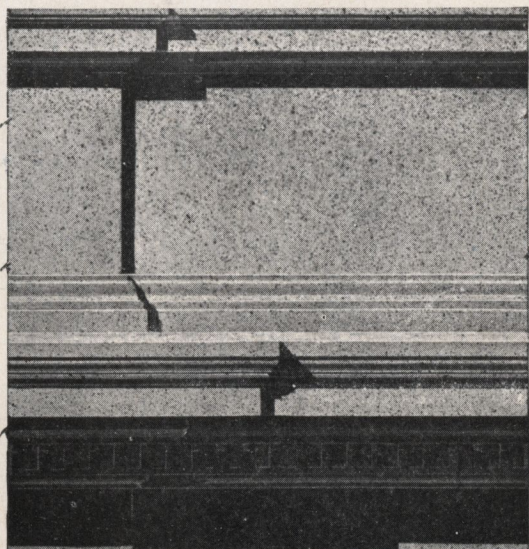
**Plate No. 9. Barre Building Granite—Polished**

EXAMPLE OF DETAILING FOR GRANITE

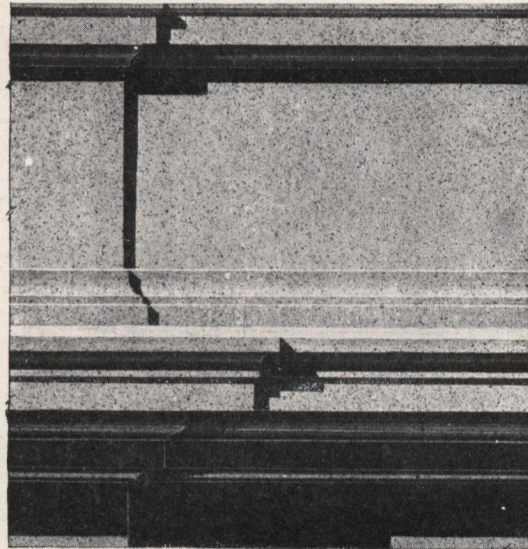
Simplification of Moulding—Applied to Specific Detail

The details below are taken from Plate XXVIII—Studies in Granite, illustrated on second page following. Profile "A" is as originally detailed, while "B" shows suggested modification for economy. The

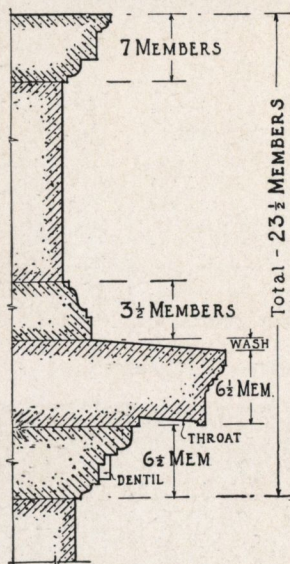
approximate saving is worked out below, showing that intelligent study of granite detail may produce material economies without seriously affecting aesthetic values.



ORIGINAL PROFILE "A"



PROFILE AS MODIFIED "B"



SECTION "A"

Comparison Between the Details Illustrated Showing Difference in Cost Based on the "Member System"

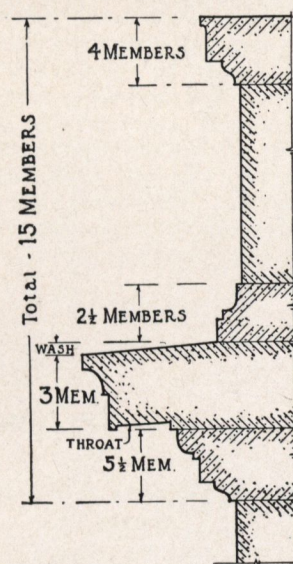
Profile "A" equals $23\frac{1}{2}$ members + dentils

Profile "B" equals 15 members

Saving: "A" — "B" equals 9 members + dentils

Assume that one member costs \$1.50 per lineal foot, and dentils at \$3.00 each. The approximate saving then is \$12.75 for members and \$9.00 for dentils, or a total saving of \$21.75 per lineal foot.

Apply this to the perimeter of the building and the total speaks for itself.



SECTION "B"

Other Studies and the Co-operation of Members of the Association

The Association has prepared comparative studies in modification of detail for economy, which are published as part of our series of "Studies in Granite" in the form of plates, similar to Plate XXVIII, as follows:

Plate XXVI—Main Entrance to Farnese Palace, Rome.

Plate XXVIII—Entrance to Palazzo Sciarra di Carbognano, Rome.

Plate XXX—Entrance to Palazzo Negroni, Rome.

Plate XXXII—Entrance to Casino of Papa Giulio's Vineyard, Rome.

Plate XXXIII—Entrance to Habitation Build-

ing, Casino of Papa Giulio.

Plate XXXIV—Window, Casino of Villa di Papa Giulio.

The representatives of the Association, or the local representatives of its various member companies, are always glad to give practical advice, from the granite man's viewpoint, as to best and least expensive types of granite construction and detail. For the architect to avail himself of this service may save him considerable time and expense in revising shop drawings after bids are taken and costs found to be excessive.

PLATE B

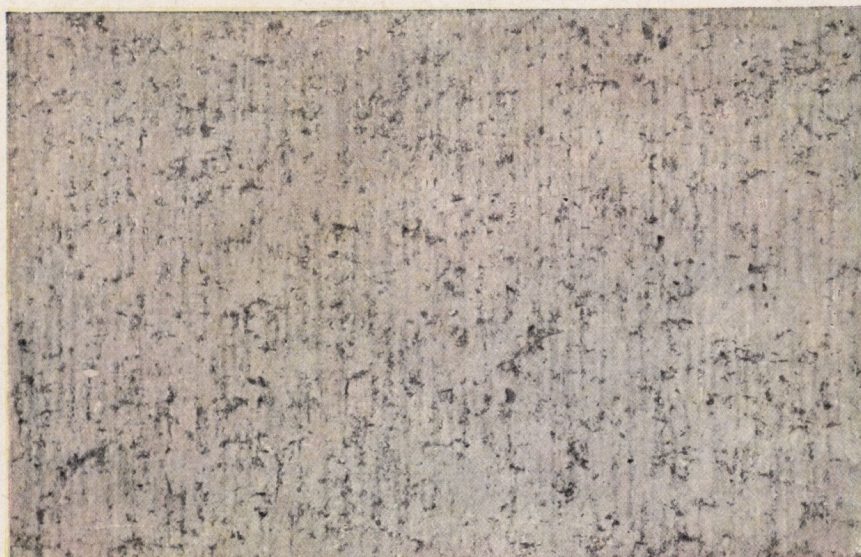
CONNECTICUT WHITE*Quarried and cut by:***Booth Bros. & Hurricane Isle
Granite Co.****208 Broadway, New York City**

Quarry at Waterford, Conn.

A quartz-monzonite granite of medium buff-gray color and even, fine grained texture. It hammers very light and its even tone and very fine grain adapt it to fine architectural and sculptural work. It is also a very fine-graded monumental and inscriptional granite. It takes a high polish which gives a buff-tinted medium to dark gray shade without mineral contrasts.

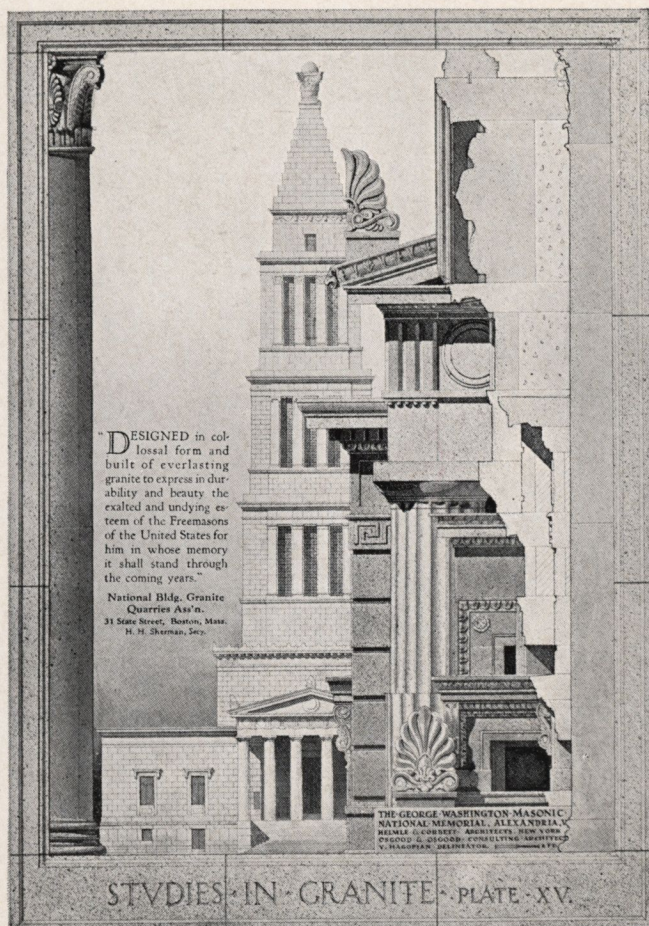
**Plate No. 10. Connecticut White Granite—Hammered****LIGHT MOHEGAN***Quarried and cut by:***Grenci & Ellis, Inc.
Peekskill, N. Y.**

A muscovite-biotite granite of light grayish-buff color and medium grain. The mica in Mohegan granite is not abundant and has very little influence upon the shade or texture of the stone. The general whiteness of the feldspars is softened by a delicate tint of buff giving it the mellowed look of old ivory. It works well under the hammer and is well adapted to carving.

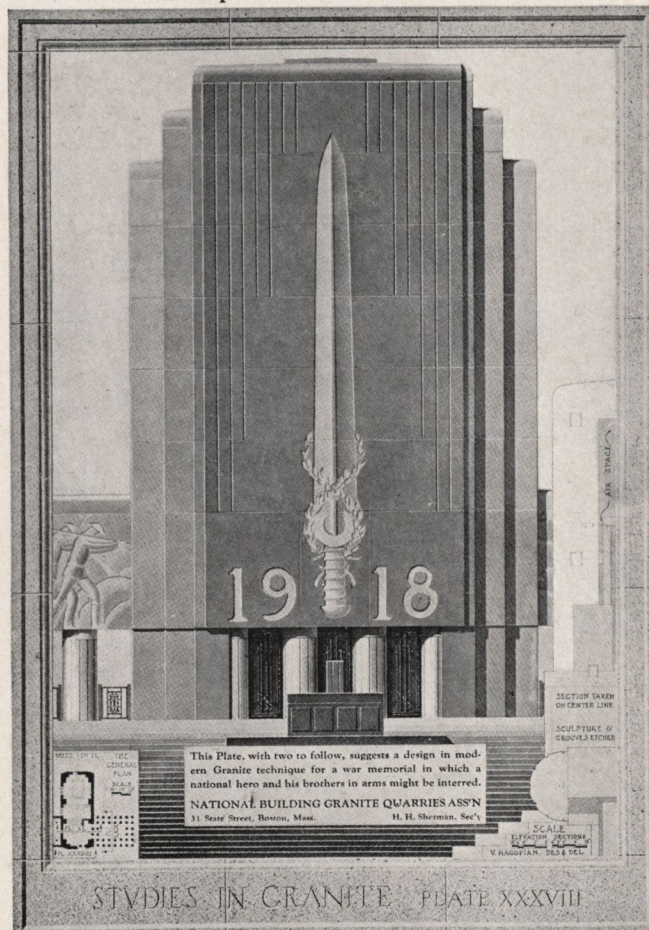
**Plate No. 11. Light Mohegan Granite—Hammered****DARK MOHEGAN***Quarried and cut by:***Grenci & Ellis, Inc.
Peekskill, N. Y.**

Dark Mohegan is identical with Light Mohegan except that its general color is a deep, yellowish-buff, which appears to be a primary color and permeates the entire stone. The deeply tinted yellow crystals give a decidedly golden cast to the polished face, and in hammered finish the surface has the soft deep buff color which is the chief characteristic of Mohegan granite.

**Plate No. 12. Dark Mohegan Granite—Hammered**



Example of First Phase of Series

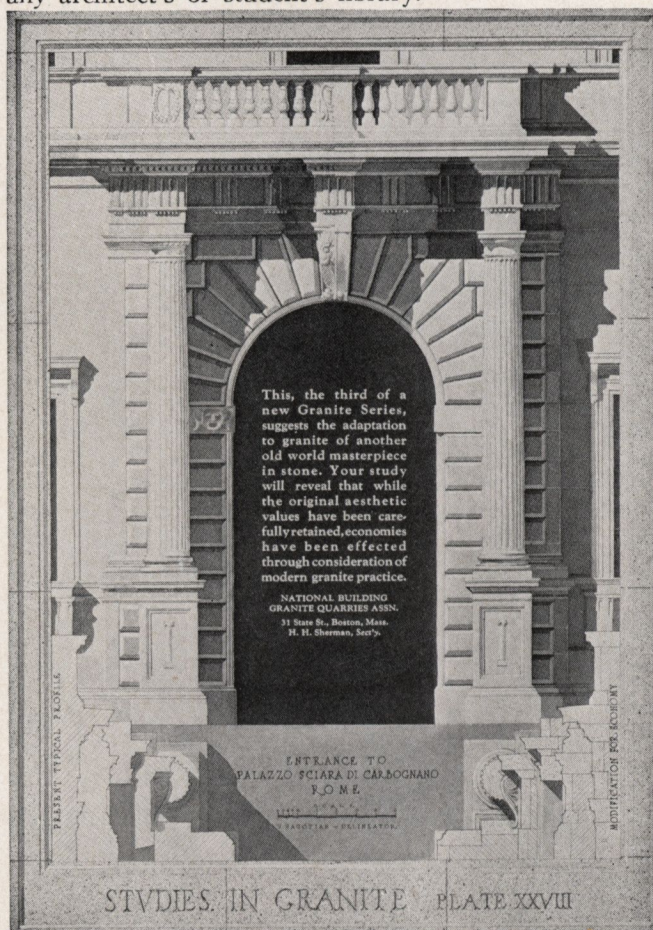


Third Phase—Original Design in Modern Manner

STUDIES IN GRANITE

The Association has been developing an interesting series of carefully rendered plates entitled "Studies in Granite." These plates illustrate the architectural use of granite and have been prepared for the information and use of designers, draftsmen and architectural students. This series has grown to a present total of forty plates, divided into three phases or groups. They have attracted world wide attention and splendid comment from the profession for their excellence in composition, rendering and practical value.

This entire series has been rendered by Vahan Hagopian, and each plate has been the subject of careful study, both from the aesthetic and practical viewpoint. They are of sufficient excellence and practical value, we believe, to make them a valuable addition to any architect's or student's library.



Second Phase—Old World Studies

The first group of twenty-five plates illustrates granite projects designed by contemporary American architects. Plate XV, illustrated at reduced size on this page, is typical of this group.

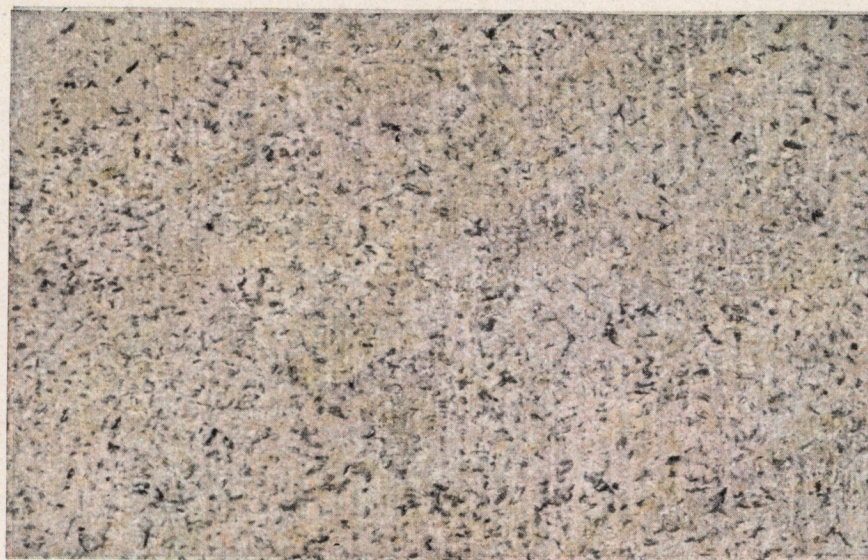
The second group, Plates XXVI to XXXIV inclusive, is based on studies of old world masterpieces in stone. Original details are compared with suggestive modifications to illustrate the possibilities of simplification without serious detriment to aesthetic values.

The phase, of which Plate XXXVIII is typical, consists of original designs illustrating the exceptional adaptability of granite to the modern trend in design and construction. This group starts with Plate XXXV and is still being added to.

The complete set of plates in any or all the groups will be sent upon request to any architect, designer, draftsman or architectural student.

SWENSON BUFF ANTIQUE*Quarried and cut by:***The John Swenson Granite Co.
Concord, N. H.**

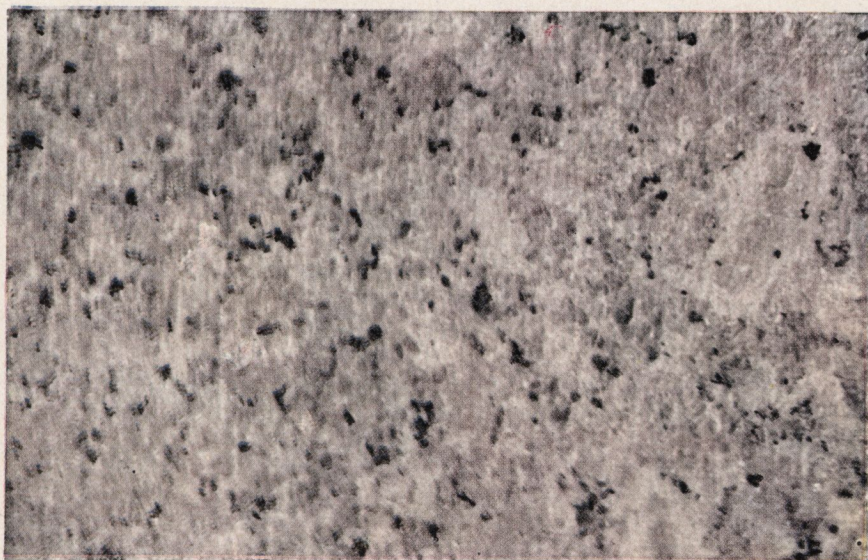
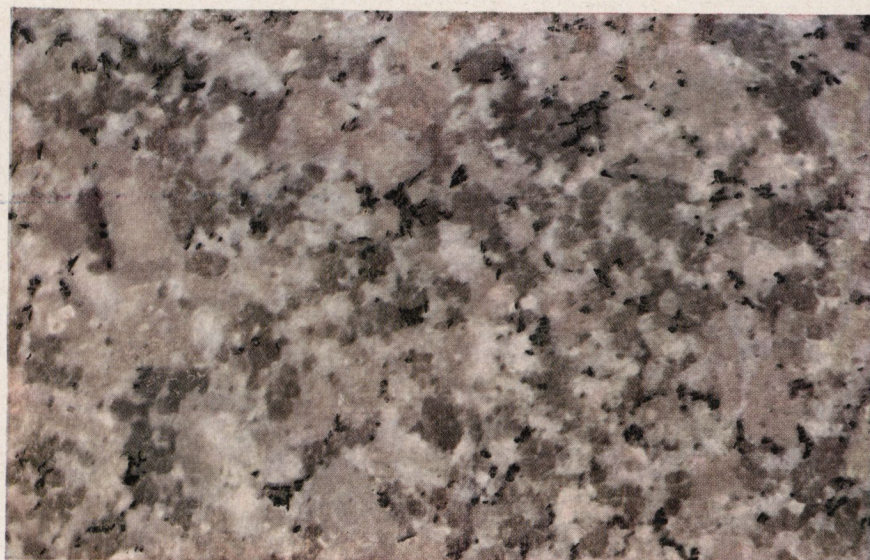
A muscovite-biotite granite of light to medium grayish buff color and fine to medium grain. It is available in variegated buff tints produced by the delicate blending of brown and gray in the mica and feldspar. It has a softness of tone and pleasing antique character which give unique charm to the work in which it has been used. Buff Antique is effective in hammered or polished finish and is especially attractive as split face ashlar with hammered trim.

**Plate No. 13. Swenson Buff Antique Granite—Hammered****GOSS PINK DEER ISLE***Quarried by:***John L. Goss Corporation
77 Summer St., Boston, Mass.**

Quarry at: Crotch Island, Stonington, Me.

A biotite granite of pinkish lavender-tinted medium gray color and coarse, even-grained texture. The mineral contrasts, softly blended on the hammered face, produce a very attractive pattern when polished, the predominating lavender colored feldspar rimmed and intergrown with milk-white feldspar, in a background of smoky quartz accented with small, sparsely scattered crystals of biotite. It works well under the hammer and takes an excellent polish.

Plate 14 shows this granite in hammered finish and Plate 15 in polished finish.

**Plate No. 14. Goss Pink Deer Isle Granite—Hammered****Goss Pink Deer Isle Granite***Is cut by the following Association members:***Booth Bros. & Hurricane Isle
Granite Co.****208 Broadway, New York City****Cook, Watkins & Patch, Inc.
Barre, Vt.****Grenci & Ellis, Inc.
Peekskill, N. Y.****Providence Granite Co.
Providence, R. I.****The John Swenson Granite Co.
Concord, N. H.****Alexander Thomson, Inc.
Providence, R. I.****Woodbury Granite Co., Inc.
Burlington, Vt.****A. Le Poidevin & Co., Inc.
286 Fifth Ave., New York, N. Y.****Plate No. 15. Goss Pink Deer Isle Granite—Polished**

PRACTICAL NOTES ON GRANITE SPECIFICATION AND DESIGN

Granite Versus Less Durable Material

Architects frequently claim that cost considerations compel the use of softer stones or material admittedly less durable and appropriate than granite.

Before ruling out a superior material like granite because of supposedly prohibitive cost, the greatest latitude should be permitted in stock, finish, jointing and details. Unsightly discoloration, weathering away or disintegration will soon neutralize or eventually efface any extra aesthetic effects which the substitution of a cheaper, less durable material may temporarily provide. The crudest of granite work retains its superior qualities indefinitely, and good granite work remains a joy forever.

The cost of granite need not ordinarily be prohibitive if certain fundamental facts are taken into consideration by the specification writer and designer.

In Regard to Specifying Color and Finish

Cost will be reduced if reasonable variations in color and texture, characteristic of most quarries, are permitted, eliminating only too obvious defects such as unsightly knots or clearly defined stripes.

Kind and quality of finish should be gauged by its effect in the building rather than at close range. The finer cuts are often specified where coarser finish would be more suitable and less expensive. Rock face and pointed work may often be used in place of hammered work, at less cost and with good effect. For plain surfaces, especially for work not near the eye, sawed finish or sawed and sand blasted is often more suitable and always economical.

Beds and Joints Deserve Attention

A surprising percentage of the cost of granite work is in the cutting of beds and joints. Elimination of unnecessary requirements here will produce material savings. Bush-hammered edges and unnecessary fullness of beds and joints add needless expense.

To require the same quality of arris and bed on coarse finishes as on fine hammered work is an expensive fallacy. It is sound trade custom to make beds conform to surface finish. Fullness of bed is a structural matter and it is sufficient in granite to provide reasonably full bearings near each vertical joint.

We recommend $\frac{1}{4}$ inch as the minimum allowance for beds and joints on monumental building work. On coarser textured work $\frac{3}{8}$ -inch or $\frac{1}{2}$ -inch joints are adequate and effective. For rock-face and more massive masonry even larger joint allowances are recommended.

Mouldings and Ornament

Hand cutting is required on practically all moulded work and ornament. The cost of hand labor is the most expensive item in granite cutting. Elimination of unnecessary members and simplification of details will reduce cost materially. Study of Plates "A" and "B," pages 8 and 10, will be of real help to the designer in working out his moulded details for economical production.

Special attention is also called to description of the sand blast process on page 16, and to carborundum sawing on page 24.

The use of the sand blast process and carbo-saw cuts for ornament opens up new and interesting possibilities for designers in granite.

Granite Carving and Models

Granite can be carved with the same delicacy of treatment and detail as much softer and less durable stones. The pneumatic carving tool, in the hands of a skilled granite carver, has made it possible and practical to carve granite to almost any extent desired, the only limiting factor being that of cost.

In the preparation of details and models for granite carving, three points should be considered: the color and texture of the granite; location in the building as to distance from the eye; and location as to sunlight.

Delicate detail would generally be wasted on a coarse grained granite having strongly contrasting mineral constituents. In a fine grained, light colored granite, or a granite of light uniform tone regardless of grain, delicate details would appear more nearly in their true values.

The character of detail and treatment, both from the aesthetic and economic viewpoints, should be regulated by the location of the carving in the building both as to distance from the eye and as to light and shade effects in different exposures.

A Few Cost Saving Pointers

The cost of granite work may be materially reduced by a study of the countless minor details from the viewpoint of economical production. A few pointers are given below as typical examples, and a study of the various granite plates illustrated in this catalogue will suggest others.

Color and Texture—Permit reasonable variations in color and grain, characteristic of the quarry from which the granite is taken.

Finish—Judge the quality of finish by its appearance in the building and specify the coarsest finish which will give the desired effect. For plain work utilize where possible the surface as it comes from the saw, lightly steered or sand blasted to avoid possibility of rust stain.

Beds and Joints—Arrises and bed edges should conform to quality of face finish. Do not require ten-cut edges on four-cut work. Reasonably full bearings near each vertical joint are sufficient for stability. Full beds entire length of stone involve needless expense.

Jointing to Save Stock and Hand Cutting—Internal angles, cut in the solid should be avoided by jointing up. Joint heads to avoid expensive back checking for steel or backing. Cornices and similar courses can often be jointed to permit sawing or machining of flat surfaces, and to save stock.

Projections—Avoid projections on courses which might otherwise be sawed or machine surfaced.

Steps and Platforms—For safety and economy four-cut or machine point treads. Sawed treads and split risers are effective and practical for inexpensive steps. Avoid unnecessary bedding to exact height by allowing at least 2 inches between top of concrete and bottom of stone on plans.

Simplification of Mouldings—Simplify as much as possible by eliminating unnecessary members and unimportant details. (See Plates "A" and "B," pages 8 and 10.)

Avoid Raised Seats and Lugs—Raised seats and lugs on balustrade base, platforms, sills and thresholds are expensive. Keep to flat surfaces where possible, using depressed lugs if necessary.

Area Coping—Four-cut or machine pointed top and split face is economical and usually adequate. Omit rabbets for grilles, substituting iron brackets. Eliminate lock joints and substitute dowels.

Balusters—Substitute round for square plinths on turned balusters. Bed to slope of base to avoid raised seats.

Rustications, Rabbets, Checks and Drips—Detail to be carbo-sawed rather than for hand cutting.

Eliminate Guesswork in Estimating—Make plans, details and specifications as complete and clear as possible and ensure closer and more intelligent estimates.

Detail for Granite—Detailing for stone, regardless of whether it is to be of granite, marble or limestone, is responsible for much of the extra cost of granite. Best results will be secured if details are made specifically for granite. The Association can render real service here if consulted while details and specifications are under way.

OLD PINK MILFORD*Quarried by:***L. Luchini & Son
Milford, Mass.**

A biotite granite of light to medium pinkish-gray color accentuated with sparsely scattered black spots. Its texture is medium to coarse, somewhat gneissoid but more even grained than the old adjoining Norcross quarry. A finer grained variety is also quarried in which the black spots are smaller and more closely distributed, giving a finer texture with about the same pinkish color and shade as the coarser grained stone.

**Plate No. 16. Old Pink Milford Granite—Polished****SWENSON PINK***Quarried and cut by:***The John Swenson Granite Co.
Concord, N. H.**

Quarry at North Berwick, Me.

A light pink biotite granite with medium to coarse texture. Occasional waves of closely segregated black and stripes of pink give a unique and attractive variation in texture. The more uniform areas have a background of creamy and pinkish feldspars, flecked with reddish pink plagioclase, mottled with smoky quartz and accented with occasional crystals of sparkling biotite. It hammers well and takes a high polish.

**Plate No. 17. Swenson Pink Granite—Polished****CONWAY PINK***Quarried and cut by:***Maine & New Hampshire Granite
Corp'n
North Jay, Me.**

Quarry at Redstone, N. H.

A biotite granite of light pinkish-gray color uniformly mottled with large dark-gray and small black spots, and having a coarse, even-grained texture. The mineral contrast is mostly between the pink feldspar and the smoky amethystine quartz, which, especially in polished finish, is quite marked and very pleasing. Minor spots of black mica give added character and interest. This granite works freely under the hammer and takes a brilliant polish.

**Plate No. 18. Conway Pink Granite—Polished**

THE ECONOMICAL SAND BLAST PROCESS AND ITS POSSIBILITIES FOR APPLICATION TO GRANITE CARVING AND SURFACE TREATMENT

The Sand Blast Process Described

This process has well been termed a "harnessing of the sand storm," for the sand blast is controlled at will to the etching of unique and beautiful ornaments. The cutting medium is white silica sand, or similar abrasive, driven through a controlled nozzle at very high velocity by compressed air, under absolute control of the operator.

The face of the stone to be "blown" is covered by a rubberlike composition about $\frac{1}{8}$ in. thick, termed "dope" or "glue" in the trade. This "dope" is then cut away from the parts to be etched, forming, in effect, a stencil of the outline or ornament.

The sand blast etches away the granite thus exposed to the depth required in a remarkably short

time. After the stenciled design is "blown," the blanket of "dope" is removed from the stone, revealing a remarkably clean cut intaglio possessing a unique texture and beauty impossible to duplicate by any other means.

Surfaces may also be etched in a similar manner to a moderate depth to produce sinkages and unique texture effects having almost limitless possibilities.

This, in brief, is the process. There are many variations in technique, and combinations of blowing, re-doping and re-blowing, by means of which a skillful

operator may produce effects in shading, variable depths and texture which have unrealized possibilities of application and development.

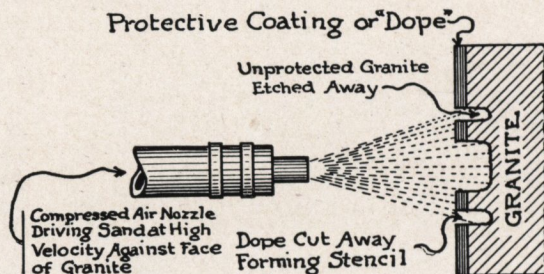


Diagram Showing Principle of Sand Blasting Process

Simple Forms of Application

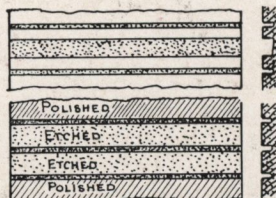
The sketches below illustrate a few typical forms of application, from which the basic principles of sand blast ornament, as developed in the memorial granite industry, may be visualized. Applications of these simple principles to architectural ornament may be developed to any extent desired.

While the sinkage produced by the etching is relatively slight as compared to regulation carving, the sharpness of its cuts and the unique tone and texture of its surfaces in contrast with hammered or polished surfaces, produce effects which cannot be duplicated by any other method.

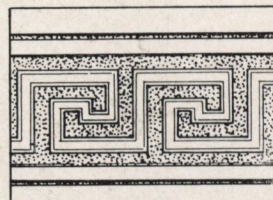
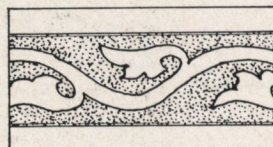
LETTERING



LINE ORNAMENT



BAND ORNAMENT



PANELS

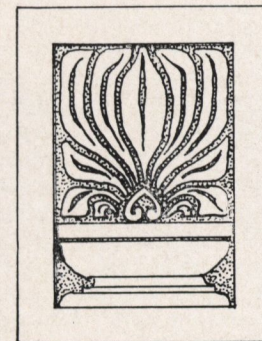
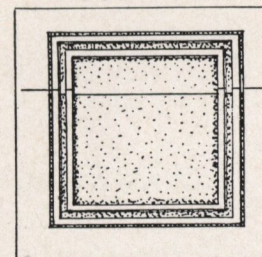


PLATE C

SOMES SOUND*Quarried and cut by:***Booth Bros. & Hurricane Isle
Granite Co.****208 Broadway, New York, N. Y.**

Quarry at Mt. Desert, Me.

A biotite granite of light pinkish-buff color with a medium, inclining to coarse, even-grained texture. The mineral contrasts are soft and pleasing, with a background of pinkish-buff feldspar, rimmed and intergrown with milk-white feldspar and delicately mottled with medium tinted smoky quartz, lightly accented with small crystals of black mica. It takes a fine polish and works well under the hammer.

**Plate No. 19. Some Sound Granite—Polished****CAROLINA PINK***Cut by:***The Harris Granite Quarries Co.
Salisbury, N. C.**

Quarried near Granite Quarry, N. C.

A biotite granite of light mottled pink color and medium, inclined to coarse, even-grained texture. Its mineral contrasts are more pronounced than in the Balfour Pink and the predominating pink feldspar has a slightly buff cast as compared with the purplish tint in the Balfour. It takes a good polish, hammers well and works more freely than the Balfour both under the hammer and the machine.

**Plate No. 20. Carolina Pink Granite—Polished****BALFOUR PINK***Quarried and cut by:***The Harris Granite Quarries Co.
Salisbury, N. C.**

Quarry at Granite Quarry, N. C.

A biotite granite of uniform, slightly purplish-pink color and medium grain. The mineral contrasts are scarcely apparent and the grain only vaguely defined, due to the uniform color and even distribution of the pink feldspars and the small amount of biotite. It is extremely hard but takes a beautiful finish either under the hammer or polishing machine. Its uniformity of color and texture and susceptibility to high polish adapt Balfour Pink to both building and monumental uses.

**Plate No. 21. Balfour Pink Granite—Polished**

INFORMATION AS TO VARIOUS GRANITE FINISHES

Description of Regular Surface Finishes, Arranged in Order of Relative Cost

The surface finishes best adapted and most frequently used for granite on building work are:

Rock Face, Sawed, Pean-hammered, Pointed, Sawed and Sand-blasted, Four-cut, Six-cut, Eight-cut, Rubbed, Honed and Polished.

These terms are frequently misunderstood and sometimes misapplied, so the following brief descriptions are given as a matter of information.

Rock Face—Generally the least expensive finish, but with decorative as well as utilitarian value.

The relative cost varies with the grade of work required.

The grades vary from ordinary split or quarry face ashlar with split or roughly squared beds and joints, to carefully quarried faces having practically uniform projection, and with joints and arrises as carefully and accurately cut as for hammered work, and sometimes with rusticated or tooled margins.

Sawed Finish—A comparatively inexpensive plain-surface finish, utilizing the surface just as it comes from the saw, without further dressing or bushing. The marks or grooves left by the gang-saw, while not regular or uniform are generally parallel and give a texture effect approximately equivalent to four or six-cut work at a reasonable distance from the eye. This finish is not recommended unless special precautions are taken both during and after sawing to avoid rust stains developing after setting and exposure to the weather.

Pean-hammered—Adapted to rougher work, such as steps, curbings, house or mill sills and thresholds, or to portions of high class work not exposed to the eye. Pean-hammering is coarser and less regular than four-cut and the point marks are not entirely eradicated by the axing.

Pointed Work—Coarse, medium, fine and machine pointed are the four general distinctions for pointed work, with many special types for certain texture effects.

Hand pointing and machine pointing differ slightly in general appearance, machine pointing being generally more uniform. Special pointing is generally more expensive than the standard grades. In general, the point depressions in fine pointing will be approximately $\frac{3}{8}$ in. apart, medium and machine pointing $\frac{5}{8}$ to $\frac{3}{4}$ in., and coarse pointing 1 to $1\frac{1}{4}$ in.

Where special pointing is required, a sample should first be prepared under the architect's supervision. Beds, joints, and arrises will conform to the character of use and grade of pointing.

Sawed and Sand-blasted—This finish utilizes the surface just as it comes from the saw which is then lightly sand-blasted, sufficiently to remove particles of steel ground into the surface during sawing and if desired to partially remove the more obvious saw marks and give a more uniform texture effect to the surface.

Four-cut, Six-cut, and Eight-cut—These finishes are produced by bushing with the patent "bush-hammer." This is a hand-hammer with patent head having two opposite jawlike openings about $\frac{7}{8}$ in. wide, into which are firmly bolted sets of four, six or eight cutting blades as the case may be.

Four-cut work is frequently and erroneously specified as four cuts to the inch. Actually the four-cut hammer leaves nearer five cut marks to the inch, as four cutting blades are clamped into a $\frac{7}{8}$ -in. jaw; six-cut and eight-cut are likewise incorrectly specified as six cuts to the inch or eight cuts to the inch.

In bush-hammered finish the resultant surface has the appearance of being uniformly corrugated to the fineness determined by the number of cuts used, but while the bushing is kept parallel and in the required direction the bush marks are not necessarily continuous or mechanically precise.

Six-cut and eight-cut finishes are simply continuations of the four-cut process, each finer hammer being used consecutively until the required finish is reached.

Pneumatic surfacing machines are also used for bushing, especially on all larger surfaces, following practically the same routine as required for hand bushing. Sawed surfaces are also bushed under the surfacing machines, in which case much of the preliminary preparation is avoided.

Ten-cut and Twelve-cut—These finishes are also produced, but less frequently used on regular building work, being more applicable to small memorials or special work. Texture and character are emphasized by the coarser finishes.

Rubbed and Honed—Produced by grinding a pointed or sawed surface under the polishing wheel. The grade of rubbing is determined by the extent to which this grinding is carried and the abrasive used; from coarse-rubbed, with small surface scratches, adapted to work requiring fine smooth finish but not close to the eye, to honed finish, which is the last stage just before glossing, with velvet smooth surface, practically free from scratches.

Polished Finish—Produced by glossing, under a heavy, felt coated wheel, a surface previously rubbed and honed. A durable and mirrorlike polish requires that the grinding and glossing processes be carried to their extreme stages, leaving a surface free from scratches, dull spots, or "stun marks" from the tooling.

Under modern methods practically every standard granite may be polished to a satisfactory gloss, suitable and durable for most ordinary requirements.

Generally the harder granites and those containing the least mica content take the best and most durable polish.

Hand Polishing—Small surfaces and mouldings generally have to be rubbed, honed or polished by hand at considerable extra expense over machine work or cut work of similar character.

On work where cost is the dominant factor portions necessitating hand rubbing or polishing should be avoided wherever possible.

Selecting the Finish

The following general suggestions will indicate methods of selection, which depend on the type and design of building, and color and texture of the granite:

Large scale work: rock-face, pointed and the coarser cuts. Small scale work: the finer cuts.

Rock-face, sawed, pean-hammered, pointed and four-cut for economy, and rock-face and pointed for decorative effect in conjunction with hammered work and other materials.

Six-cut or sawed and sand-blasted for average work, combining economy with good architectural effect.

Polished for base courses, portions subject to traffic strain, lower stories where exposed to smoky atmosphere, and for decorative effect.

Rubbed or honed where fine finish is required and for softened tone and texture effects.

Polished finish is practically impervious to stain or weather. Fine finishes will keep clean longer than coarser finishes, particularly where subject to atmospheric dirt and dust.

The possibilities of combining different grades of finish are almost unlimited, and combinations of different granites are used extensively with splendid architectural results.

JONESBORO RED*Quarried and cut by:***Booth Bros. & Hurricane Isle
Granite Co.****208 Broadway, New York, N. Y.**

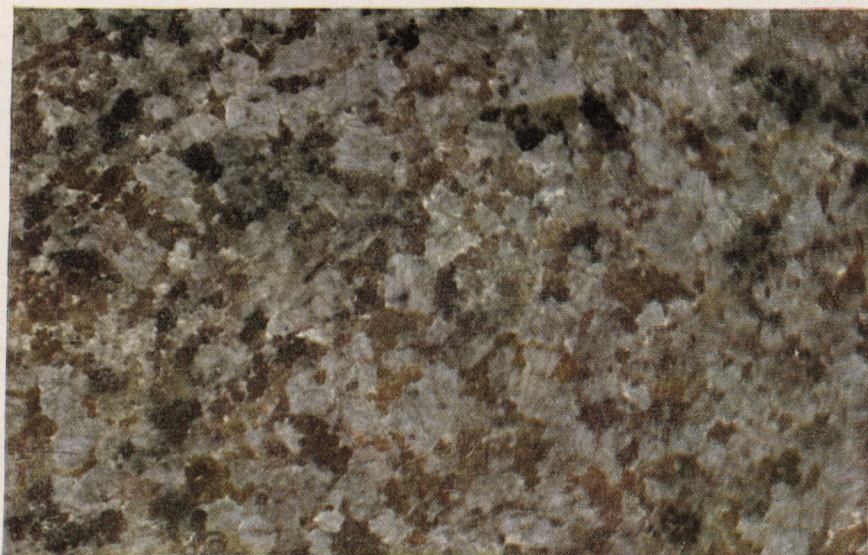
Quarry at Jonesboro, Me.

A biotite granite of medium reddish-pinkish-gray color and of coarse, inclining to medium, even-grained texture. The mineral contrasts are strong and effective. The reddish-pink of the predominating feldspar is emphasized by the less abundant cream-colored feldspar and the even mottling of smoky quartz. It takes a fine polish, the durability of which is favored by the smallness of the sparsely scattered biotite scales.

**Plate No. 22. Jonesboro Red Granite—Polished****CONWAY GREEN***Quarried and cut by:***Maine & New Hampshire Granite
Corp'n****North Jay, Me.**

Quarry at Redstone, N. H.

A biotite-hornblende granite of dark olive-green color with black spottings and with coarse, even-grained texture. The predominating feldspar is medium gray with more or less yellow-green on its cleavage faces. The feldspar is surrounded with smoky quartz of dark yellowish or olive-green color accented by sparsely distributed black spots of biotite and hornblende. It takes a high polish and its color is striking both in the rough and polished.

**Plate No. 23. Conway Green Granite—Polished****Regarding Color Plates and Descriptions**

It is impossible to duplicate with printer's ink and paper the real beauty and character of these granites. Made up of mineral constituents, nearly all of which are of gem-like quality, some opaque, some translucent and others of glass-like transparency, the true liveliness and penetration of color tones inherent in the actual granites are entirely lacking or but vaguely suggested in the color reproductions. For that reason, and in justice to the granites and their producers, the necessity for examining actual samples before making final selections is urgently suggested.

Practically all the granites reproduced in this catalogue and the quarries which produce them have been studied by eminent disinterested geologists both from the scientific and economic viewpoints, and their findings and conclusions published in official bulletins. In describing the colors, textures and other outstanding characteristics of the various granites, these unbiased reports and descriptions have been studied and utilized as far as possible and summarized in similar and somewhat comparable form to accompany the color plates.

Standard Grades of Surface Finishes

The half-tone reproductions on pages 20 and 21 illustrate the standard grades of surface finishes most commonly used on exterior building granite work. The reproductions are full size from actual photographs of the various finishes on a standard light gray granite. The reproductions are darker than the actual granite to bring out more distinctly the texture of the different finishes.

The relative costs of the different finishes runs in approximately the same order as the reproductions are numbered, with rock-face as the least and polished as the most expensive. No reproductions are shown of the sawed or sawed and sand-blasted finishes described on page 18, but their position as to relative cost would be approximately that of No. 2 and No. 6 respectively.

Complete sets of samples adopted as standard by the Association, and illustrating the finishes reproduced here are displayed in the permanent exhibits maintained by the Association at its headquarters in Boston, the Architects Samples Corporation in New York and the Master Stone Cutters Association in Philadelphia.

STANDARD GRADES OF FINISHES FOR EXTERIOR BUILDING GRANITE WORK
Full-sized Reproductions Prepared from a Standard Light to Medium Granite of Fine to Medium Grain

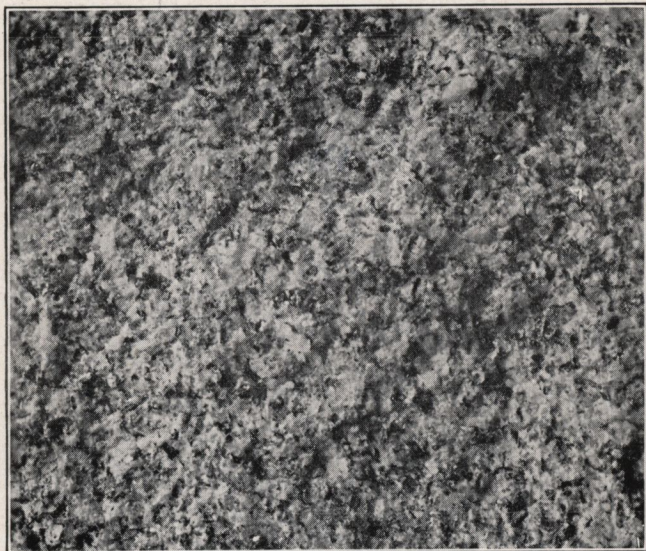


Plate No. 1. Rock Face



Plate No. 4. Medium Pointed



Plate No. 2. Pean-hammered



Plate No. 5. Fine Pointed

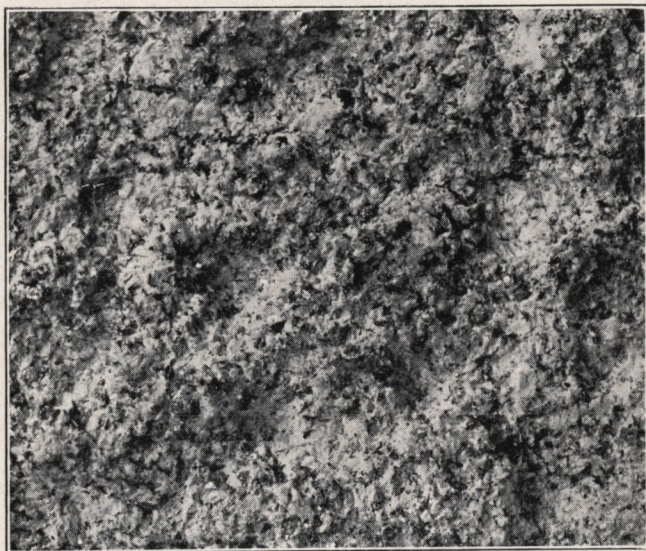


Plate No. 3. Coarse Pointed

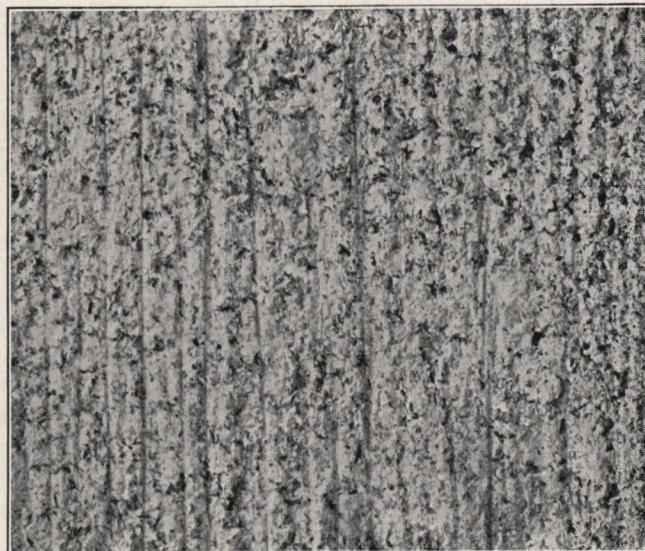


Plate No. 6. Four-cut

STANDARD GRADES OF FINISHES FOR EXTERIOR BUILDING GRANITE WORK

Full-sized Reproductions Prepared from a Standard Light to Medium Granite of Fine to Medium Grain

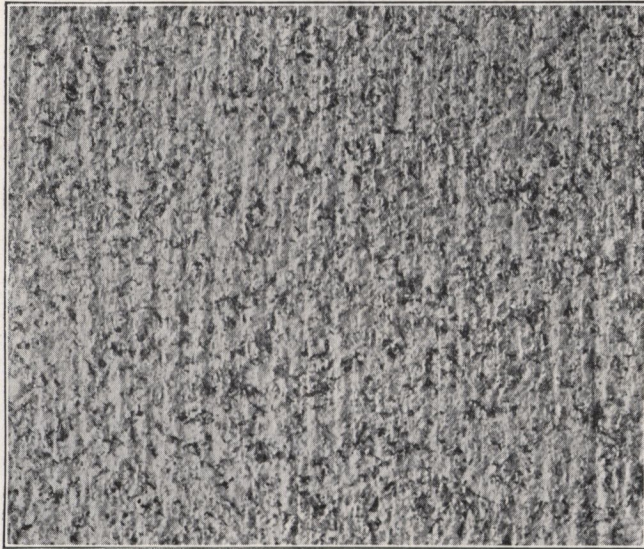


Plate No. 7. Six-cut



Plate No. 10. Rubbed.

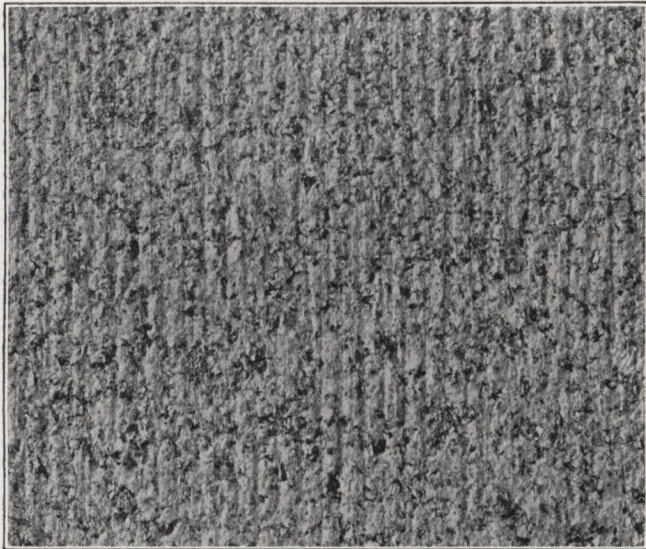


Plate No. 8. Eight-cut

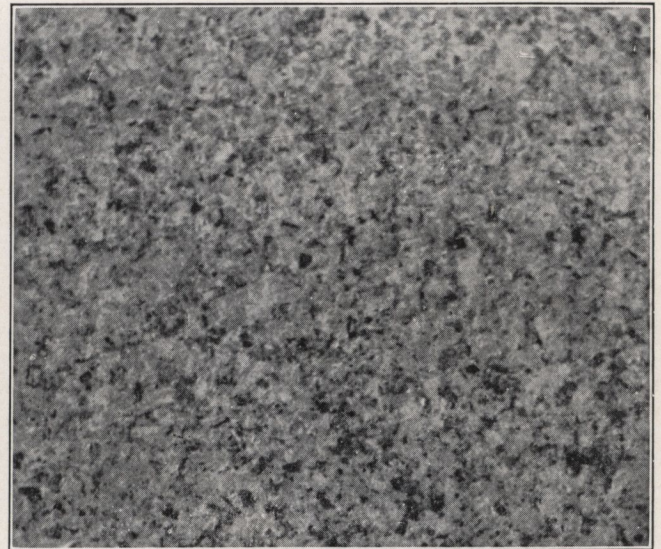


Plate No. 11. Honed



Plate No. 9. Ten-cut

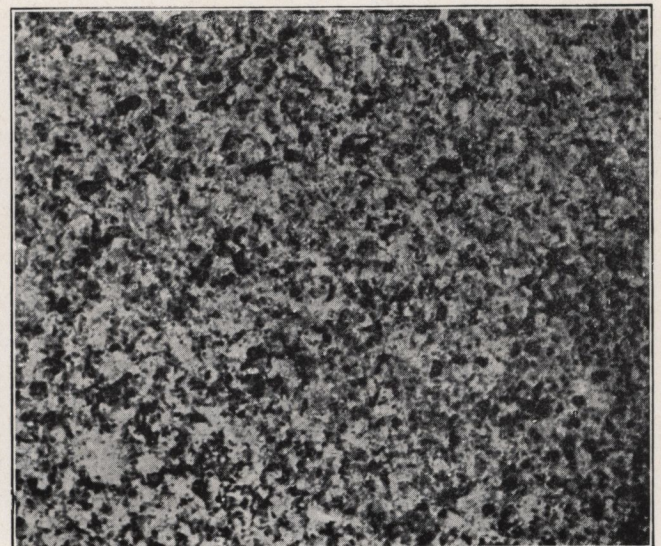


Plate No. 12. Polished

GRANITE SPECIFICATIONS

SHORT FORM FOR REGULATION CUT GRANITE WORK

The Association has prepared a complete form of granite specifications for use on projects of major importance and of monumental building grade which is available on request. The following short form has been prepared as more convenient for ordinary use while still conforming to requirements of high grade work of the type classified herein as good commercial grade.

(1) **Work Included**—The work to be done shall include the furnishing, delivery, and setting of all granite work required by the drawings and specified herein. (State portions of work to be of granite and note any exceptions about which there might be any questions.)

(2) **Material**—The granite shall be sound and of good quality, free from defects which would impair the strength, durability, or appearance of the work, and equal to the approved sample. In estimating, the contractor shall state the name of granite and quarry, upon which his proposal is based. The following granites will be considered: (mention color, tone and grain) granite from (mention locality).

(3) **Samples**—Submit in duplicate, for the architect's approval, samples of the granite showing the extreme variation in quality, color and texture to be used under the contract, and showing the specified finishes. (State size of samples required.)

(4) **Shop Drawings**—The granite contractor shall prepare all necessary shop drawings, showing in detail the jointing, bonding, and construction of the granite work, and special anchoring. These shall be submitted to and approved by the architect before any cutting is done.

(5) **Finishes**—The exposed surfaces of the granite shall be finished as indicated on the drawings or specified herein.

Note: State finishes desired.

(6) **Cutting**—All exposed surfaces shall be out-of-wind, free from waves, projections, or depressions and flush at the joints. Arrises shall be cut sharp and true to square or pattern, and continuous with adjoining arrises.

(7) **Bed and Joints**—Beds shall be cut full and square for at least 2 in. from face, and may fall off not to exceed 1 in. in 12 in., reasonably free from large depressions. Joints to be full and square at least 1½ in. from face, falling off not to exceed 1½ in. in 12.

(8) **Backs of granite** shall be scabbled or split to approximately vertical surfaces.

(9) **Jointing** shall be as shown on approved drawings and ¼ in. in thickness.

(10) **Bonding**—Shall be as shown on approved drawings, with no bed less than 4 in. Projecting course shall have beds at least equal to projection, unless otherwise shown.

(11) **Mouldings**—Shall be cut with uniform profile throughout their lengths, in conformity with full size details, with lines true and straight, and flush at joints.

(12) **Washes and Drips**—Washes shall be cut on stones whose top surfaces are exposed, unless otherwise shown. Projecting stone shall have groove drip cut on underside.

(13) **Raised seats or lugs** shall be cut where stone work rests on projections or washes, and raised thresholds shall be cut on exterior door sills.

(14) **Reglets** shall be cut for flashing where shown or required.

(15) **Models**—Full size plaster models of all ornamental and carved work shall be furnished to the granite contractor, who shall preserve these models for reshipment to the building, if required.

(16) **Roughing for Carving**—This shall be done from approved models only, leaving the stone in suitable form and condition for the carving.

(17) **Carving**—All carved ornament shall be executed by skilled carvers, in a spirited and artistic manner, and in strict conformity with the approved models.

(18) **Crating and Shipping**—The finished granite shall be properly crated for shipment, to protect the surfaces and edges of all exposed work.

(19) **Precaution Against Stain**—Precaution shall be taken at all times to protect the granite from stain.

(20) Under no circumstances shall salt be used for thawing out lewis-holes, or otherwise in connection with the granite work.

(21) (If dampproof painting is required, specify requirements here.) After setting, the backs of all mortar joints shall be suitably dampproofed to prevent moisture from the backing seeping through the joints.

(22) **Setting**—The setting of the granite work shall be done by competent, experienced stone setters, and in strict accordance with the approved drawings and specifications.

(23) Each granite stone shall be brushed clean and thoroughly drenched immediately before setting and carefully bedded in a full bed of non-staining mortar. The granite facing shall not be built up more than two courses ahead of the backing, and the faces shall be kept free of mortar at all times.

(24) All surplus mortar shall be immediately raked out to a depth of at least 1 in. Sills, etc., subject to pressure shall be bedded only at the ends.

(25) Where a joint is exposed to the weather, it shall be made waterproof by mixing a satisfactory waterproofing compound with the mortar.

(26) The sand used in all setting mortar shall be such as will cause no stain, or chemical action with the cement.

(27) **Anchoring**—The granite shall be anchored to the backing with galvanized iron anchors, ¼x1¼ in., turned down into the granite 1¼ in., extending 8 in. into the backing if possible, and turned up into the backing 1½ in. There shall be two anchors to each stone whose length exceeds its height and, in general, not less than two anchors to every superficial yard of ashlar. All anchors, bolts, ties, etc., shall be furnished to the granite contractor.

Note: Special anchoring for heavy cornices and overhanging courses, cramps, dowels, etc., for parapets, balustrades, pilasters, columns, etc., should be suitably described or shown according to the requirements of the work.

(28) **Boxing and Protection**—All the granite work shall be protected by the general contractor during the progress of the work and until the completion of the building. No lumber or material shall be used which will in any way stain or deface the granite work.

(29) **Centers and Scaffolding**—All necessary forms, centers, scaffolding, etc., required by the setter or carver, will be furnished by the general contractor.

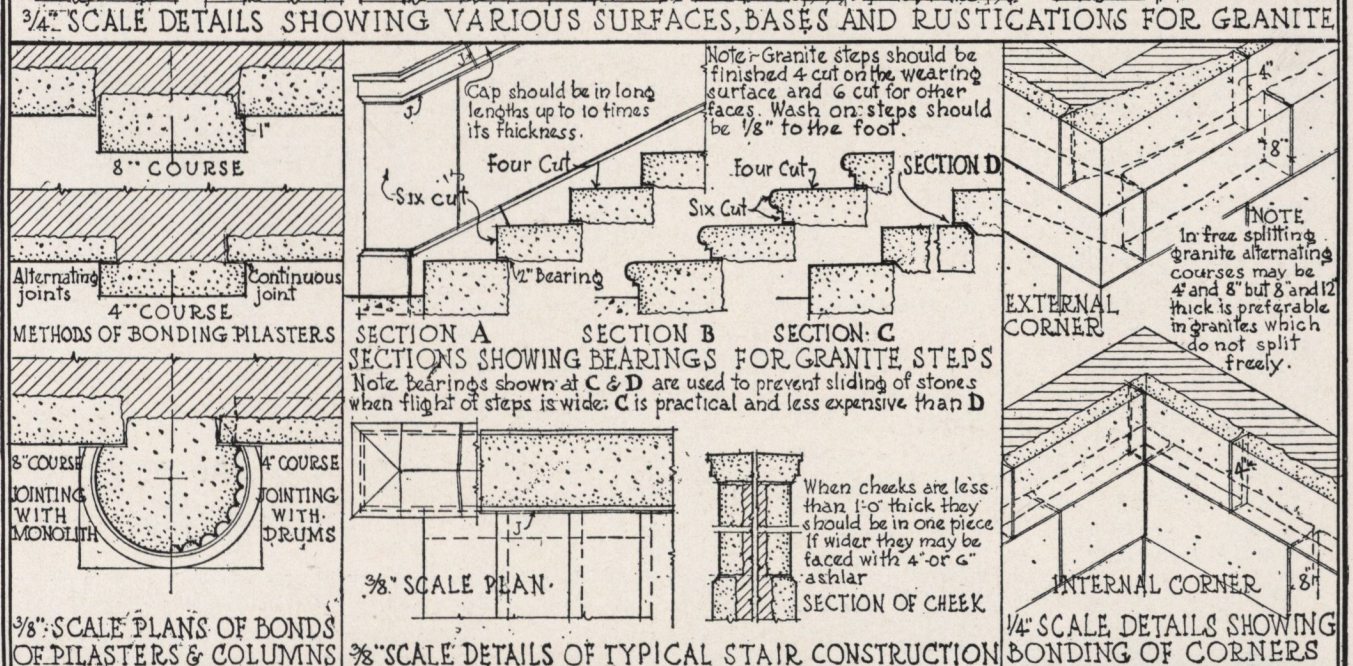
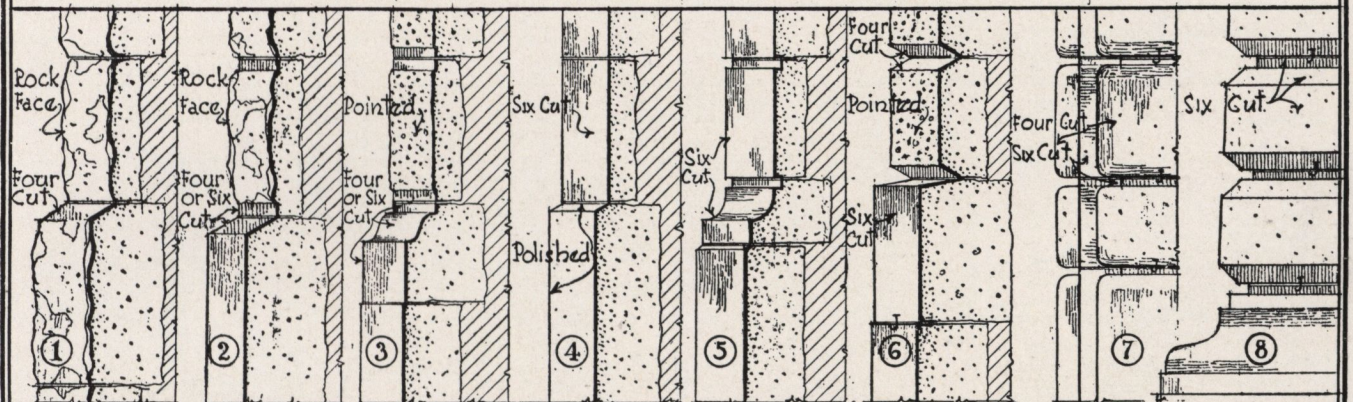
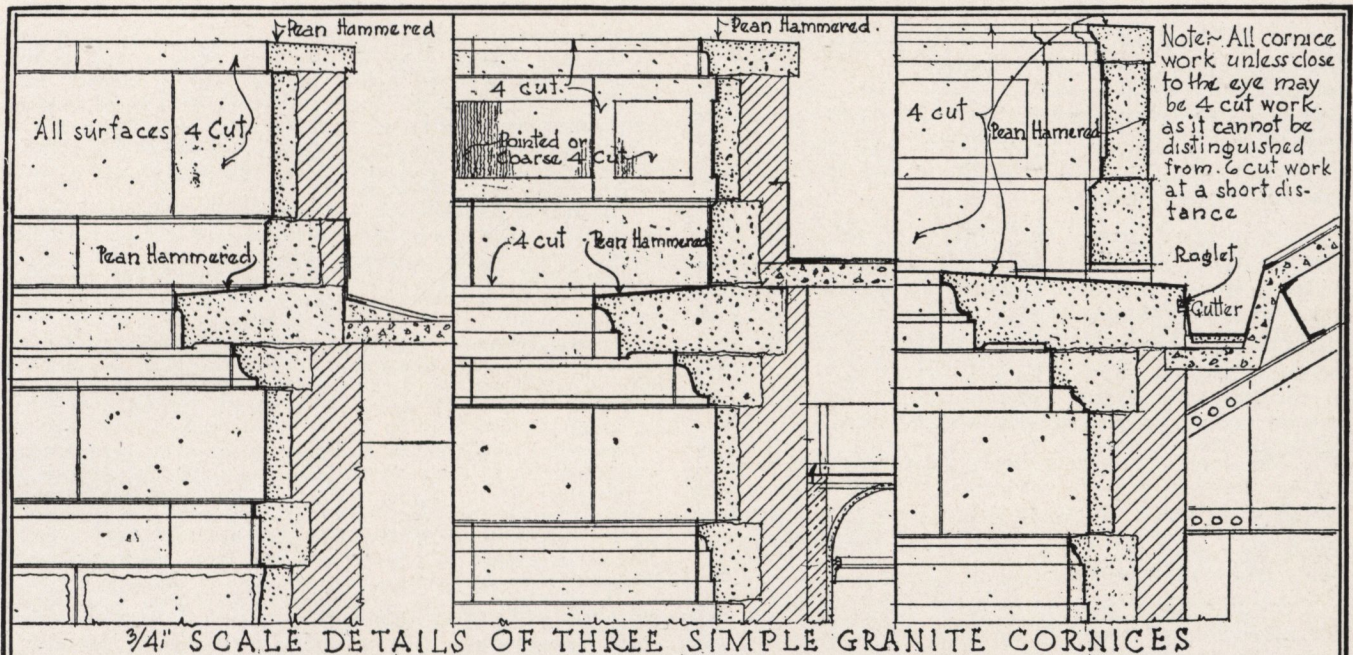
(30) **Pointing and Cleaning**—After all liability from stain or damage from other operations on the building is passed, the granite work shall be carefully cleaned, removing all dirt, mortar stains and other defacements. The use of wire brushes, acids, and solutions which might cause discoloration, will not be permitted.

(31) All face joints shall be brushed out, thoroughly wet with clean water, and carefully pointed as directed by the architect.

Note: See long form for special treatment of vertical joints in uncovered cornices, and joints in upper surfaces of projecting stones.

(32) **Defective Work**—No patching or hiding of defects will be permitted.

Defective stones shall be replaced with perfect ones, unless otherwise directed by the architect.



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TYPICAL GRANITE DETAILS SHOWING PRACTICAL METHODS OF CONSTRUCTION

SCALE ~ 3/8" = 1'-0"	DRWG
DATE - JUNE-20	3

MODERN GRANITE VENEER

In buildings of the more modern type, where the exterior facing serves as a decorative and protective veneer rather than as a structural element, the use of granite is developing to such an extent and production methods are being so revolutionized that special consideration must be given to detailing and specifications for this type of work.

Its inherent beauty and variety of color and texture, its ability to take a high and durable polish, and its imperviousness to moisture and resistance to weathering even in the thinnest of slabs, give granite exceptional qualifications for use as exterior veneer. The extensive development and use of saws and carborundum machines in the granite industry have made the furnishing of granite veneer both feasible and economical.

The term "granite veneer" is applied to finished facing less than 4 in. in thickness. Granite veneer can be produced down to 1 in. in thickness, but for practical purposes 2 in. is recommended as the minimum thickness for exterior work.

Specifications describing hand finished work are not applicable in many respects to this type of work, and a few useful pointers are given below as a guide to the specification writer and designer.

Specification Pointers

Surface Finish—The finishes best adapted for granite veneer include polished, honed, rubbed (fine to coarse), and sawed and sand-blasted. Bush-hammered or pointed finishes are not recommended for work under 4 in. in thickness.

Projecting Edges—On polished, honed and rubbed veneer, projecting edges not exceeding $\frac{3}{4}$ in. wide may be left without further finish if carbo-sawed.

Beds and Joints—Beds and joints shall be full and square at least two-thirds back from face, reasonably free from depressions and may fall off not to exceed $\frac{1}{2}$ in. at back.

Width of Joints—Joints shall be uniformly $\frac{1}{4}$ in. in width. (When desired to make jointing less conspicuous in polished or honed veneer, $\frac{1}{8}$ -in. or $\frac{1}{16}$ -in. joints may be specified.)

Quirk Joints—To avoid expensive back-checking for wide heads or reveals, quirk joints are recommended. The exposed edge of joint may be carbo-sawed. Joint surface should be full for at least $1\frac{1}{2}$ in. and may fall off not to exceed $\frac{1}{2}$ in. at the back.

Bonding—Where the veneer is not counted in computing wall thickness under building code requirements, no bonding is necessary either in the wall or by breaking joints.

Setting—Granite veneer should be set in non-staining mortar and backs of all mortar joints should be suitably damp-proofed or parged to prevent moisture from seeping through the joint from the backing.

Anchoring—Anchor to backing or steel with $\frac{3}{8}$ -in. round iron, galvanized after bending, turned down $\frac{3}{4}$ in. into the stone (where veneer is 2 in. or less in thickness), using two anchors in top bed of each stone. (For 3-in. veneer turn down 1 in. and $1\frac{1}{4}$ in. for 4-in. veneer.)

ILLUSTRATING THE BASIC PRINCIPLES AND ECONOMICAL USE OF GRANITE SAWING AND CARBORUNDUM MACHINE WORK

GRANITE GANG SAW

Thickness of Slabs

4"-Ordinary Minimum
2"-Practical Min.
1"-Possible, but Special

Thickness of Cut or Saw-Kerf

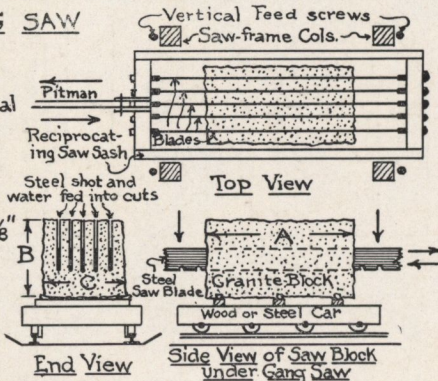
Small saws - $\frac{5}{8}$ "
Average saws - $\frac{3}{4}$ "
Large saws - $\frac{7}{8}$ " to $1\frac{1}{8}$ "

Cost

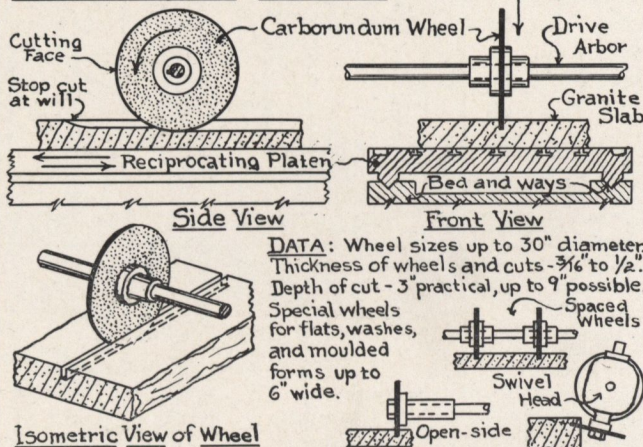
Ordinarily no saving under 4", and veneer under 2" will ordinarily cost more per sq. ft. than 4" work, F.O.B.

MAXIMUM SAW BLOCK SIZES

	A	B	C	ROTARY SAWS
Small Gang Saws	10ft.	5ft.	5ft.	No limit as to (A) length.
Average Gang Saws	12 or 14ft.	6 or 7ft.	6ft.	Height (B), from 3'-6" to 5'-0"
Special Gang Saws	14 to 18ft.	8 to 14ft.		
Average sawing - 3 to 7 blades				



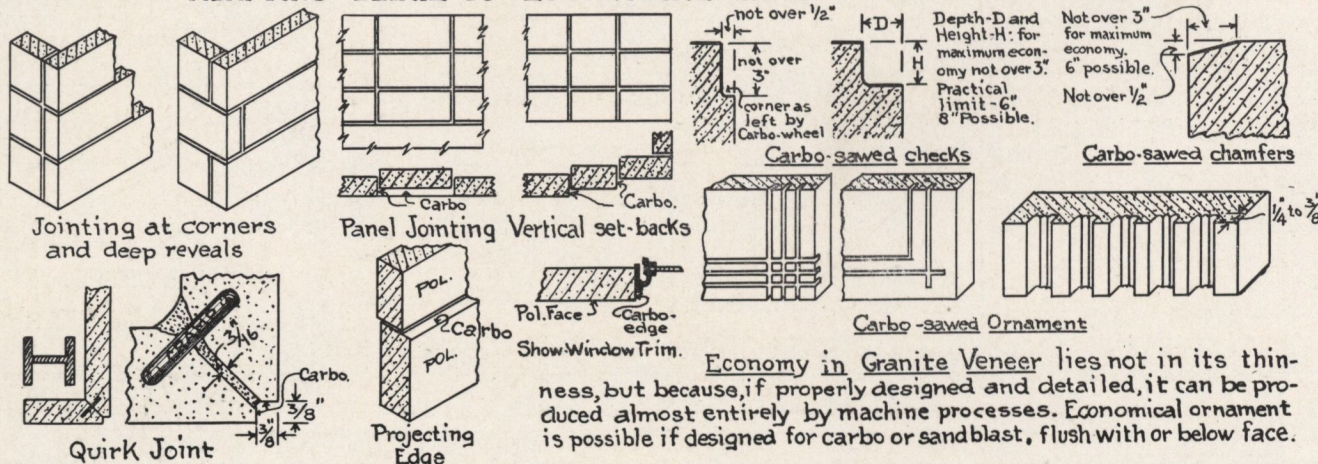
CARBORUNDUM MACHINE



DATA: Wheel sizes up to 30" diameter. Thickness of wheels and cuts - $\frac{3}{16}$ to $\frac{1}{2}$ ". Depth of cut - 3" practical, up to 9" possible. Special wheels for flats, washes, and moulded forms up to 6" wide.

TYPES

ADAPTING DETAIL TO ECONOMICAL SAWING AND CARBO-WORK



Economy in Granite Veneer lies not in its thinness, but because, if properly designed and detailed, it can be produced almost entirely by machine processes. Economical ornament is possible if designed for carbo or sandblast, flush with or below face.

RUBBLE ASHLAR

The Use of Granite as Rubble Ashlar

The demand for granite as rubble ashlar has grown to such an extent that many granite quarries are now giving special attention to the production of this class of masonry material. One and two man rubble, specially split to appropriate sizes and shapes, eliminates much of the expensive shaping and trimming on the job formerly required when waste stone was used for this purpose, and enables competent masons to lay it up in the wall with minimum cost and excellent architectural effects.

There are many forms of rubble ashlar walls. The pattern and style of jointing and the color and texture effects obtainable in granite are practically unlimited. Broken range rectangular ashlar in rock-face, split-face, quarry-face or combinations of these faces, constitute the major demand and is rapidly becoming a regular product of our building granite quarries. Its extensive use for churches, schools, residences, apartment houses, retaining walls and bridges, indicates the increasing interest of architects and owners and the need for practical information as to its production, specification and economical use.

A digest of practical points with sketches illustrating the more typical methods of using this material economically is given here for the information of specification writers and designers.

Specification Pointers

Material—Specify granite by name or by color and grain. Specify sound quarry stock free from seams or defects which would impair strength. Permit reasonable variations in color and texture. If special variegated effect is desired, describe same.

Type of Ashlar—Many types of ashlar walls are used. Three types of rectangular broken range ashlar are illustrated below. Specify type desired and whether it is to be rock-face, split-face, quarry-face or a combination of these.

Dressing—Roughly squared as to length and rise. Beds and joints split or pitched approximately square to face. Faces pitched out-of-wind. No drill holes to show on face.

Thickness—Range of 4 to 8 in., average about 6 in.

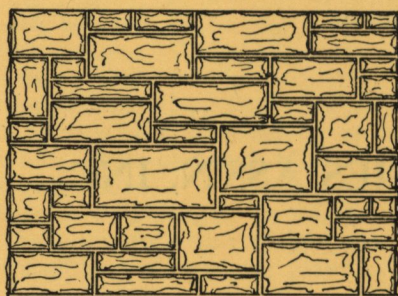
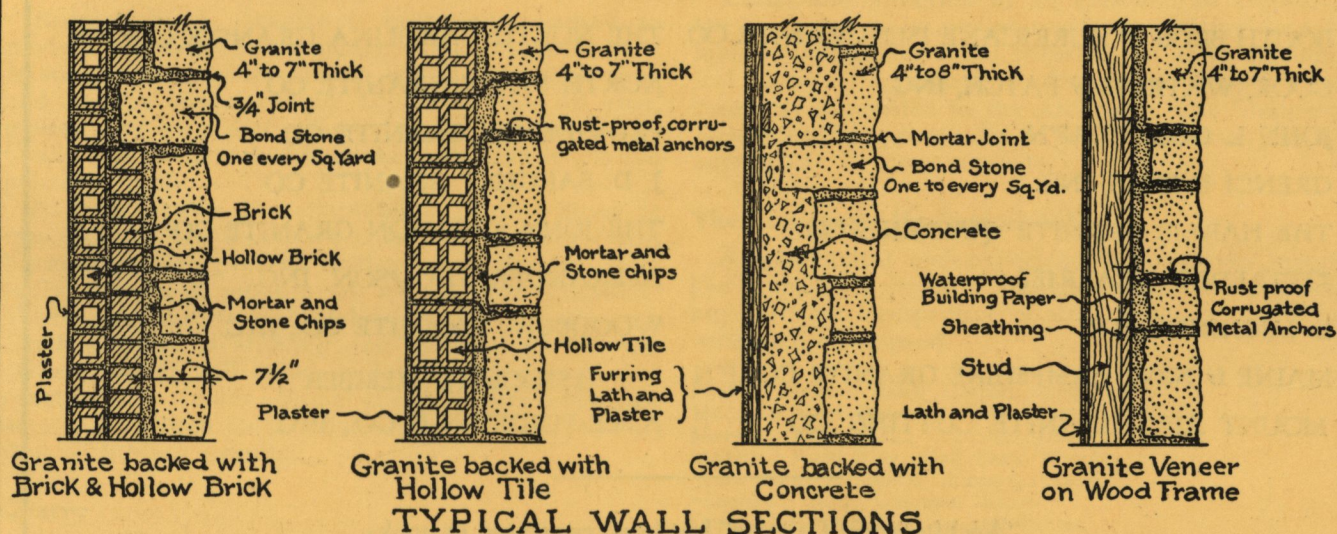
Bonding—At least one bond stone, about twice average thickness of ashlar, for every square yard of wall surface. Where type of wall will not permit bond stones, anchor granite to backing with rust-proof, corrugated metal wall ties.

Jointing—Allow $\frac{3}{4}$ or 1 in. for beds and joints. Permit reasonable variations over and under specified joint thickness, provided variation does not mar general appearance of wall after pointing-up.

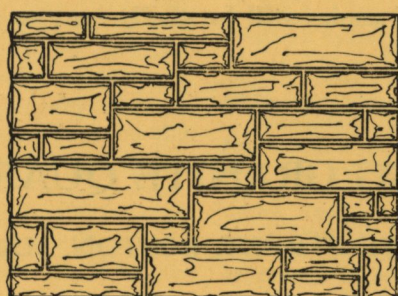
Setting—Set in full bed of mortar, tap firmly to solid bearing and thoroughly fill end joints with mortar.

Setting Mortar—One part cement, two parts sand, thoroughly mixed and brought to putty-like consistency with clean water. If desired one part slaked lime putty or hydrated lime putty may be included. Rake out joints to depth of $\frac{3}{4}$ in. for pointing. Keep face free from mortar.

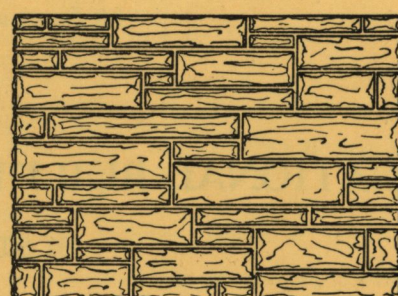
Cleaning and Pointing—Clean down thoroughly after setting and point-up with any approved type of pointing desired. For average work a $\frac{3}{4}$ -in. flat bead pointing is recommended. Forbid use of wire brushes, acids or solutions which might discolor the granite.

ROCK FACE BROKEN RANGE ASHLAR WALLS
USING ONE & TWO-MAN GRANITE RUBBLE

Typical Wall Pattern
Rise 6" to 18"
Length $\frac{1}{2}$ to 2 times rise



Moderate Elongated Pattern
Rise 6" to 16" - High pieces averaging 12"
Length about three times rise



Extreme Elongated Pattern
Rise 4" to 12". Length five to six times rise. Wall leveled every 22".

ELEVATIONS SHOWING STYLES OF FACE JOINTING

ARCHITECTURAL GRANITE

This catalogue, "Architectural Granite," has been prepared and placed in SWEET's by the National Building Granite Quarries Association to the end that reliable and unbiased information concerning granite and its architectural uses may be readily available to architects and others interested.

The information herein is based upon the combined experience and practical knowledge of the member companies whose joint support and co-operation make this and other services of the Association possible and valuable alike to the granite industry and to users of its products.

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ARCHITECTURAL GRANITE

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